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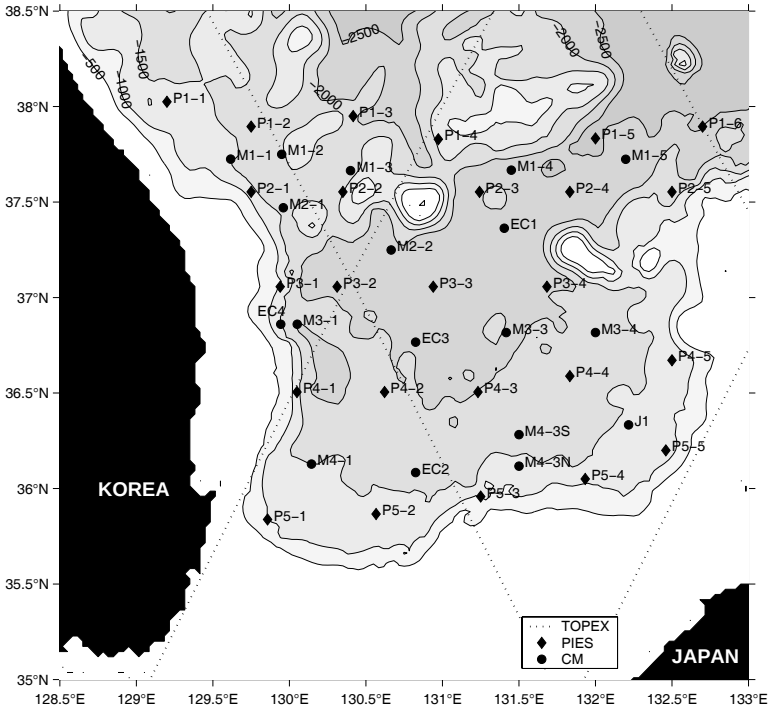
Current Meter Data Report

Ulleung Basin of Japan/East Sea

June 1999 to July 2001



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Abstract

Observations were conducted from June-1999 to July-2001 to study shallow and deep current variability in the southwest Japan/East sea. Data were collected during the field experiment with a two-dimensional array of pressure-gauge equipped inverted echo sounders (PIES) and deep recording current meters (RCM). This report documents the current meter data, which were collected with an array of 12 moorings that was in place for the two-year period. Instrument preparation, calibration and deployment/ recovery procedures, plus data processing procedures are discussed. Basic statistics of the cleaned hourly data and forty-hour low passed filtered time series are presented, followed by time series of the currents and temperatures measured by the Aanderaa current meters. The final section shows plots of mean current vectors and variance ellipses as well as histograms of current speed and direction.

Contents

List of Tables

List of Figures

1 Setting and Design of the Experiment

1.1 Introduction

This report documents current and temperature data collected from recording current meters (RCM) as part of field studies conducted in the Japan/East Sea under the sponsorship of Office of Naval Research(ONR). These RCMs were deployed during cruise HAHNARO-06 aboard R/V Melville (June 6 to June 16, 1999). The recovery cruise was Cook Leg 09 aboard R/V Melville (June 21 to July 4). This experiment was conducted to study shallow and deep current variability in the Southwestern Japan/East Sea between Korea and Japan. This is a joint program between University of Rhode Island (D.R. Watts and M. Wimbush) and the Naval Research Lab (W.S. Teague). Other data collected as part of this program include those from pressure-gauge-equipped inverted echo sounders (PIES), 4 current meter moorings deployed by Korean Ocean Research and Development Institute (KORDI, Dr. M-S. Suk) and an additional current meter mooring installed by the Research Institute for Applied Mechanics at Kyushu University (RIAM, Dr, J-H. Yoon). Detailed documentation about the KORDI and RIAM RCMs will be in separate reports.

The principal objectives of the study were as follows:

1. Observe the time-varying transports of the branches of the Tsushima Current in the Ulleung Basin.

2. Produce daily maps, from observations in the Ulleung Basin, of the upper-layer circulation and path-variability of the Offshore Branch and East Korean Warm Current, with mesoscale resolution.

3. Understand the physical coupling between the shallow and deep currents and eddies within this region, where large-amplitude meanders and steep loop formations occur.

4. Quantify cross-frontal and vertical fluxes associated with mesoscale processes

in the East Korean Warm Current.

The current data from this array of current meters will be used to level the PIES pressure measurements. The combined instruments (23 PIESs and 17 RCMs) provide two-year time series of dynamic height, vertical shear, and deep current fields, enabling us to map the upper and deep absolute current and temperature structure on a daily basis.

1.2 The Moored Instrument Array

To address the experiment's objective, an array of PIESs and current meter moorings was deployed in the study area shown in Figure 1. The array, moored within the Ulleung Basin of the Japan/East Sea, consisted of 25 PIESs arranged in a roughly 5 by 5 array with 55–60 km spacing between sites. Deep RCMs were placed nominally midway between the PIES sites. The moorings maintained by scientists at KORDI and RIAM are also shown.

Position, depth, instrument information, launch time and release time for the URI current meter moorings are given in Table 1. Of the 13 RCMs deployed by URI all were recovered except the one at site M3-4.

Each mooring supported one current meter, an Aanderaa model RCM8. The instruments were positioned about 24 meters above the anchor. The mooring design is shown schematically in Figure 2.

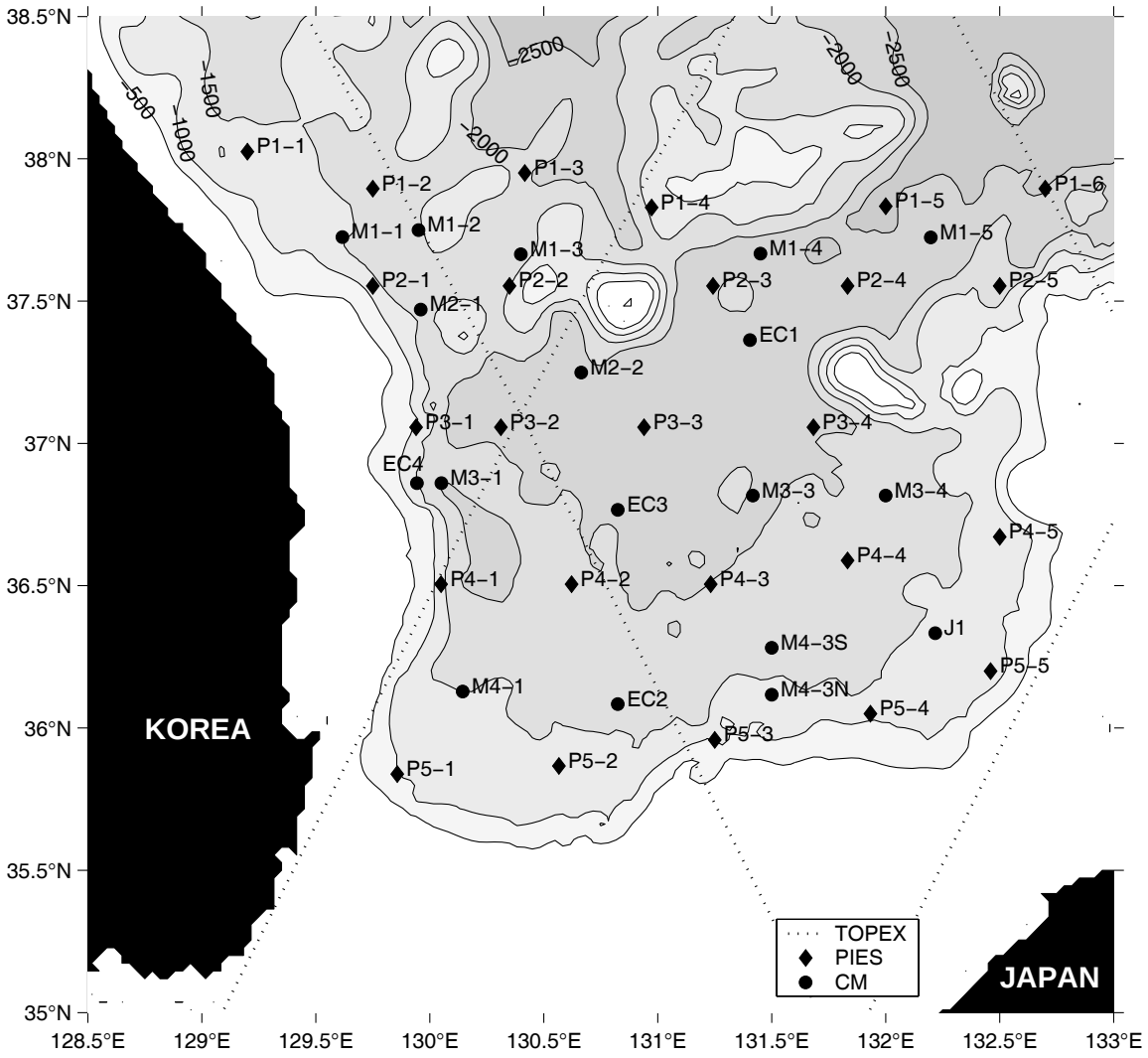


Figure 1: The moored array in the Ulleung Basin of the Japan/East Sea. Diamonds designate pressure-gauge-equipped inverted echo sounder (PIES) sites. Dots designate the deep current meter mooring locations (labeled Mj-k for URI sites, ECj for KORDI sites, Jj for the RIAM site). TOPEX/POSEIDON altimeter ground tracks are shown by dotted lines. The bathymetry is gray-shaded with shallower depths indicated by white and deeper depths by darker hues of gray; bathymetric contours are labeled in meters. The eastern portion of the Korean Peninsula is on the left, and a segment of Honshu, Japan is at the lower right.

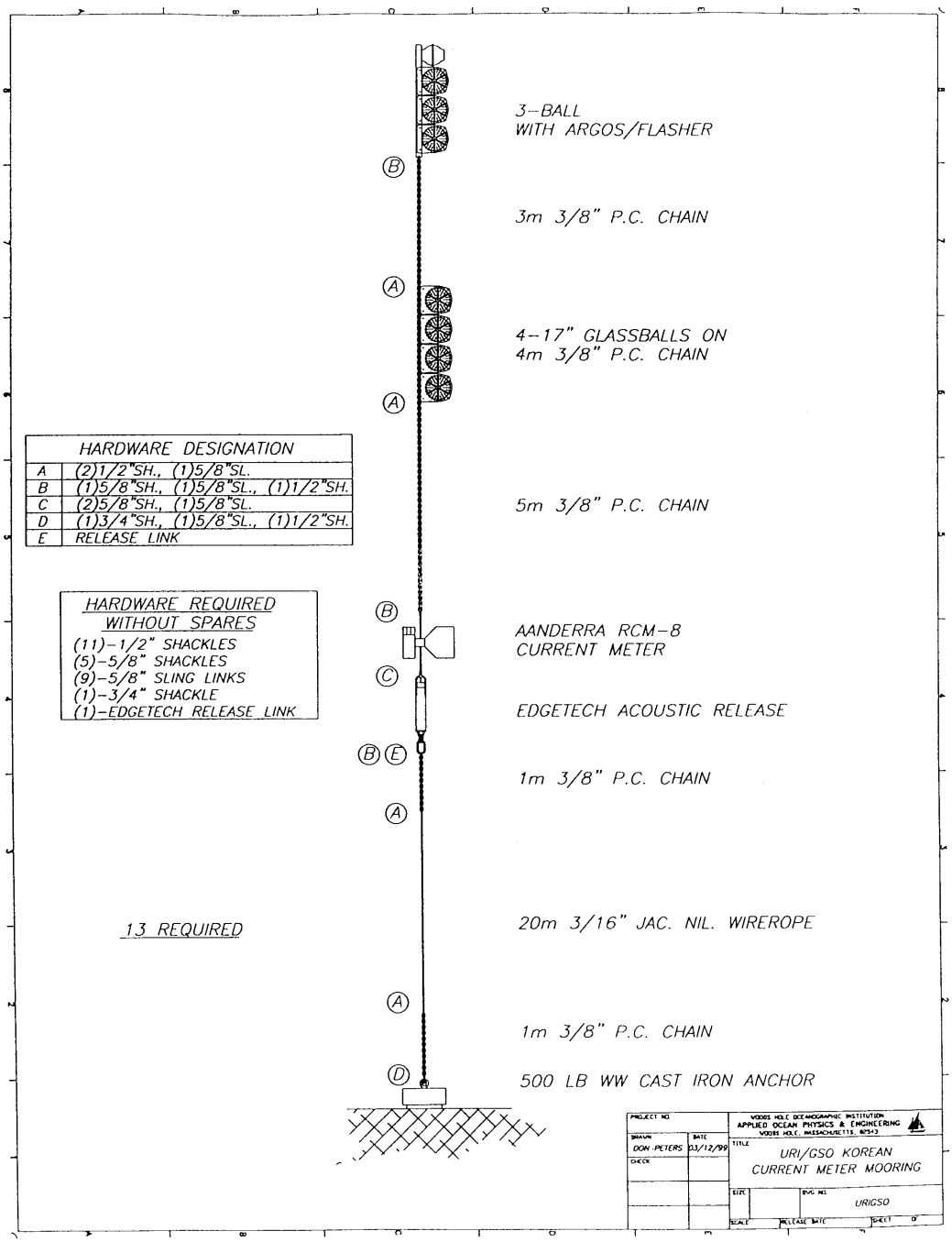


Figure 2: Schematic of the mooring designs of the Aanderaa current meter. Glass balls and 500 lb anchor were used to hold the mooring line taut.

Table 1: Site Information

Site	SN	Lat (N)	Lon (E)	Depth(m)		Launch		Recovery	
				Bot	Ins	Date	UT	Date	UT
M1-1	7077	37°43.47′	129°37.04′	1220	1197	6/10/99	0251	6/29/01	0417
M1-2	9296	37°45.00′	129°57.00′	1662	1639	6/10/99	0713	7/1/01	0130
M1-3	9266	37°39.86′	130°24.00′	1570	1547	6/11/99	0640	7/1/01	2241
M1-4	9687	37°40.00′	131°27.00′	2381	2358	6/13/99	0055	6/23/01	0221
M1-5	9324	37°43.44′	132°11.90′	2448	2425	6/13/99	0450	6/22/01	2200
M2-1	9268	37°28.20′	129°57.62′	1557	1534	6/12/99	0605	7/1/01	0354
M2-2	7357	37°14.94′	130°39.92′	2227	2204	6/12/99	1008	6/30/01	0318
M3-1	7356	36°51.65′	130°3.04′	2211	2188	6/12/99	0133	7/02/01	1723
M3-3	9591	36°49.00′	131°25.00′	2051	2028	6/9/99	2345	6/24/01	2346
M3-4	12553	36°49.00′	132°0.00′	1825	1802	6/8/99	2022	Lost	Lost
M4-1	9325	36°7.70′	130°8.48′	1550	1527	6/7/99	0859	6/27/01	1822
M4-3s	7355	36°7.00′	131°30.02′	1546	1523	6/8/99	0106	6/26/01	0948
M4-3n	9685	36°16.92′	131°29.98′	1797	1774	6/14/99	0852	6/26/01	0800

2 Instrument Calibration

2.1 Introduction

The Aanderaa RCM8s in this experiment measured the temperature (T), direction (D), and speed (S) of the current. None included optional sensors for pressure or conductivity. Each measurement in an RCM8 is recorded as an 8-bit number N from 0 to 1023. The desired variable is found from a polynomial in N:

$$X = A_3N^3 + A_2N^2 + A_1N + A_0$$

where X is either T or D. The set of coefficients A_n are different for T and D and are unique to each instrument. Coefficients for T and D were individually calibrated for each instrument at the URI Technical Services facility by cycling them through a suite of accurate T and D measurements, recording the corresponding suite of N values, and fitting a cubic polynomial to the measurements. The coefficients for S are those recommended by Aanderaa for the response of their paddle-wheel rotor:

$$S = A_1N + A_0$$

where A_0= 1.0 and A_1 = 0.2688 to obtain speed in cm/s for all instruments. A_0 and A_1 values are updated here based on June 25, 2001 communication to M. Wimbush from R. Butler of Aanderaa regarding results of tow-tank calibration at IFREMER on 20 RCMs with this paddle-wheel rotor design.

2.2 Temperature Calibration

Temperature calibration was performed on a group of five instruments at a time in a circulating-water controlled-temperature bath. Independent reference temperatures were measured by a SeaBird sensor (Model SEB3, with accuracy 0.0003°C). The bath was cycled through about a dozen temperatures from approximately 16°C to below

1°C. The cubic polynomial was fitted to the values, and the coefficients for each RCM8 are listed in Table 2.

2.3 Direction Calibration

Compass direction calibration occurred on a rotating platform that is keyed to orient the RCM8 at a sequence of stops at 15 or 30 degree intervals through the full range (0 to 360 degrees) of compass headings. The exact reference magnetic headings at each stop were independently measured by a Manufacturer KVH Model C100 flux-gate compass (accuracy ±0.5 degree). The RCM8 was swung in both clockwise and counterclockwise directions to minimize effects of hysteresis in its compass readings. A cubic polynomial was fitted to the set of N_i, D_i data pairs, and the coefficients are listed for each RCM8 in Table 2.

Table 2: Calibration Coefficients for T in °C, D in degrees (from magnetic north) towards which the current is flowing, S in cm/s. M1-4 had battery failure and is not included in the table.

Site	Variable	A_3	A_2	A_1	A_0
M1-1	T	2.8368e-09	-2.5025e-06	2.3219e-02	-2.5423e+00
7077	D	-2.0650e-08	3.1006e-05	3.4252e-01	-1.3799e+00
	S	———	———	0.2688	1
M1-2	T	2.6405e-09	-2.3759e-06	2.3164e-02	-2.4951e+00
9269	D	1.0177e-08	-7.7594e-07	3.4231e-01	3.7483e-01
	S	———	———	0.2688	1
M1-3	T	3.2911e-09	-3.0294e-06	2.3317e-02	-2.4908e+00
9266	D	3.4822e-09	-1.6619e-05	3.6423e-01	-4.1599e-01
	S	———	———	0.2688	1
M1-5	T	2.2788e-09	-1.8379e-06	2.2927e-02	-2.4436e+00
9324	D	9.7878e-09	-9.2718e-06	3.5132e-01	1.5474e+00
	S	———	———	0.2688	1
M2-1	T	3.1927e-09	-3.2264e-06	2.3505e-02	-2.5156e+00
9268	D	3.5636e-08	-3.9932e-05	3.5768e-01	3.3686e+00
	S	———	———	0.2688	1
M2-2	T	3.2391e-09	-3.1641e-06	2.3456e-02	-2.5843e+00
7357	D	-2.3028e-08	4.8663e-05	3.2665e-01	-1.1212e+00
	S	———	———	0.2688	1
M3-1	T	2.9427e-09	-2.4920e-6	2.3134e-02	-2.5477e+00
7356	D	-7.3359e-08	1.2991e-04	2.9023e-01	8.5507e-00
	S	———	———	0.2688	1
M3-3	T	4.2251e-09	-4.7244e-06	2.4129e-02	-2.6797e+00
9591	D	-1.0282e-08	3.8519e-05	3.2212e-01	1.8059e+00
	S	———	———	0.2688	1
M4-1	T	1.9627e-09	-4.5327e-07	2.1929e-02	-2.3170e+00
9325	D	-3.0166e-09	2.3360e-05	3.3077e-01	1.5145e+00
	S	———	———	0.2688	1
M4-3n	D	2.6364e-09	-2.4688e-06	2.3272e-02	-2.6138e+00
7355	D	-1.0053e-07	1.9707e-04	2.4704e-01	1.1502e+01
	S	———	———	0.2688	1
M4-3s	T	5.1463e-09	-5.6318e-06	2.4309e-02	-2.6929e+00
9685	D	2.3894e-08	-2.6507e-05	3.5749e-01	-5.8127e-01
	S	———	———	0.2688	1

Table 3: Clock Drift Information

Site	Drift(min) Sampling	Drift(min) DSU	Delta Time(hr)	UTC Begin Date & Time	UTC End Date & Time	DSU End Date & Time
M1-1	-18	-9	1.00001655263745	6/5/99 5:23	6/29/01 9:41	6/29/01 9:32
M1-2	-22	-27	1.00002016979306	6/5/99 1:16	7/1/01 12:38	7/1/01 12:11
M1-3	-20	-12	1.00001832609443	6/5/99 4:09	7/2/01 1:29	7/2/01 1:17
M1-5	-24	-10	1.00002225436749	6/5/99 1:46	6/23/01 0:10	6/23/01 0:00
M2-1	-21	-27	1.00001926358079	6/5/99 5:05	7/1/01 6:26	7/1/01 5:59
M2-2	-24	-21	1.00002204464041	6/5/99 4:47	6/30/01 6:11	6/30/01 5:50
M3-1	+38	-24	0.99996523012175	6/5/99 4:23	7/3/01 2:45	7/3/01 2:21
M3-3	-18	-9	1.00001664632127	6/5/99 3:55	6/25/01 2:13	6/25/01 2:04
M4-1	-22	-9	1.00002026566439	6/5/99 3:07	6/28/01 0:29	6/28/01 0:20
M4-3n	-22	-21	1.00002030494331	6/5/99 1:58	6/26/01 12:20	6/26/01 11:59
M4-3s	-22	-7	1.00002030719256	6/5/99 2:48	6/26/01 11:10	6/26/01 11:03

3 Data Processing

3.1 Raw Data Transcription

We followed standard procedures for downloading the Data Storage Units (DSUs) using the Aanderaa software and DSU reader (Data reading program 5059. Version 1.00-Built81).

3.2 Clock Drift Correction

Prior to deployment, the current meters were set up to sample once per hour. However, clock drifts of up to 40 minutes occurred during the two year deployment. These were spread uniformly through the entire record at each current meter by adjusting the sampling interval. Table 3 shows the drifts and new sampling intervals.

3.3 Magnetic Correction

Current speeds are measured by rotor revolutions and directions by vane orientation referenced to an internal compass magnetic north. Hence, the magnetic variation is added to the measured values to convert to true direction. Magnetic variations were computed at each mooring site using the worksheet provided by the

Table 4: Magnetic variation in degrees. Values near the beginning and end of the deployment period are also given for the four corner RCMs.

Site	7/1/99	7/1/01	Difference	7/1/00
M1-1	-7.917	-7.967	0.05	-7.95
M1-2				-7.983
M1-3				-7.983
M1-5	-8.067	-8.117	0.05	-8.083
M2-1				-7.883
M2-2				-7.867
M3-1				-7.7
M3-3				-7.75
M4-1	-7.433	-7.483	0.05	-7.467
M4-3S	-7.500	-7.550	0.05	-7.533
M4-3N				-7.583

US National Geophysical Data Center at website http://www.ngdc.noaa.gov/cgi-bin/seg/gmag/fldsnth2.pl. For the JES array, the magnetic variation ranged from -8.1 to -7.5 degrees. Table 4 gives the magnetic variation for each current meter calculated for July 1, 2000, approximately the middle of the deployment period. Values near the beginning and end of the deployment period and their difference are given for the four corner RCM sites, showing that the magnetic variation changes during the deployment by only 1/20 degree.

3.4 Removal of Tides

Speed and direction time series were converted to U and V time series, where the U velocity component is positive towards East and the V component is positive towards North. The eight main tidal constituents (M2, S2, N2, K2, K1, O1, Q1, and P1) were removed in the first step of processing the data. The harmonic analysis technique was used to determine the constituent amplitudes and phases by least squares fitting sinusoids for the U and V data. This procedure does not require equally spaced data and thus skips over the stall periods. The tide constituents, M2, S2, N2, K1, O1,

Table 5: Flagged records and interpolation information.

Site	Percent of record flagged	Percent of flagged record that was interpolated
M1-1	23	38
M1-2	23	21
M1-3	68	5
M1-5	41	14
M2-1	44	12
M2-2	23	28
M3-1	29	34
M3-3	51	9
M4-1	30	44
M4-3S	22	49
M4-3N	23	44

and Q1, are well resolved with a minimum of one month of hourly data. The tide constituents, K2 and P1, require about six months of data.

3.5 Stall and Bad Data Treatment

Minimum resolvable speed was 1.4 cm/s and those speeds not exceeding this value were treated as stalls. All records identified as stalls were flagged. Additionally, a few of the records contained bad data even though the speeds exceeded the minimum resolvable speed. These data records were also flagged. After removing the tidal signals from both components of the current, splines were fitted to the U and V components individually, specifying knots at all non-flagged data values. Flagged data which extended for periods no longer than five consecutive samples (i.e., 5 hours) were replaced with the spline-fitted values. U and V were set to zero whenever more than five flagged records occurred in a row. Table 5 lists the percentage of records that were flagged and the percentage of flagged records that were interpolated. Almost all flagged records were due to stalls. Figure 3 shows the mean average velocity computed with the stalls spline-fitted and with the stalls excised.

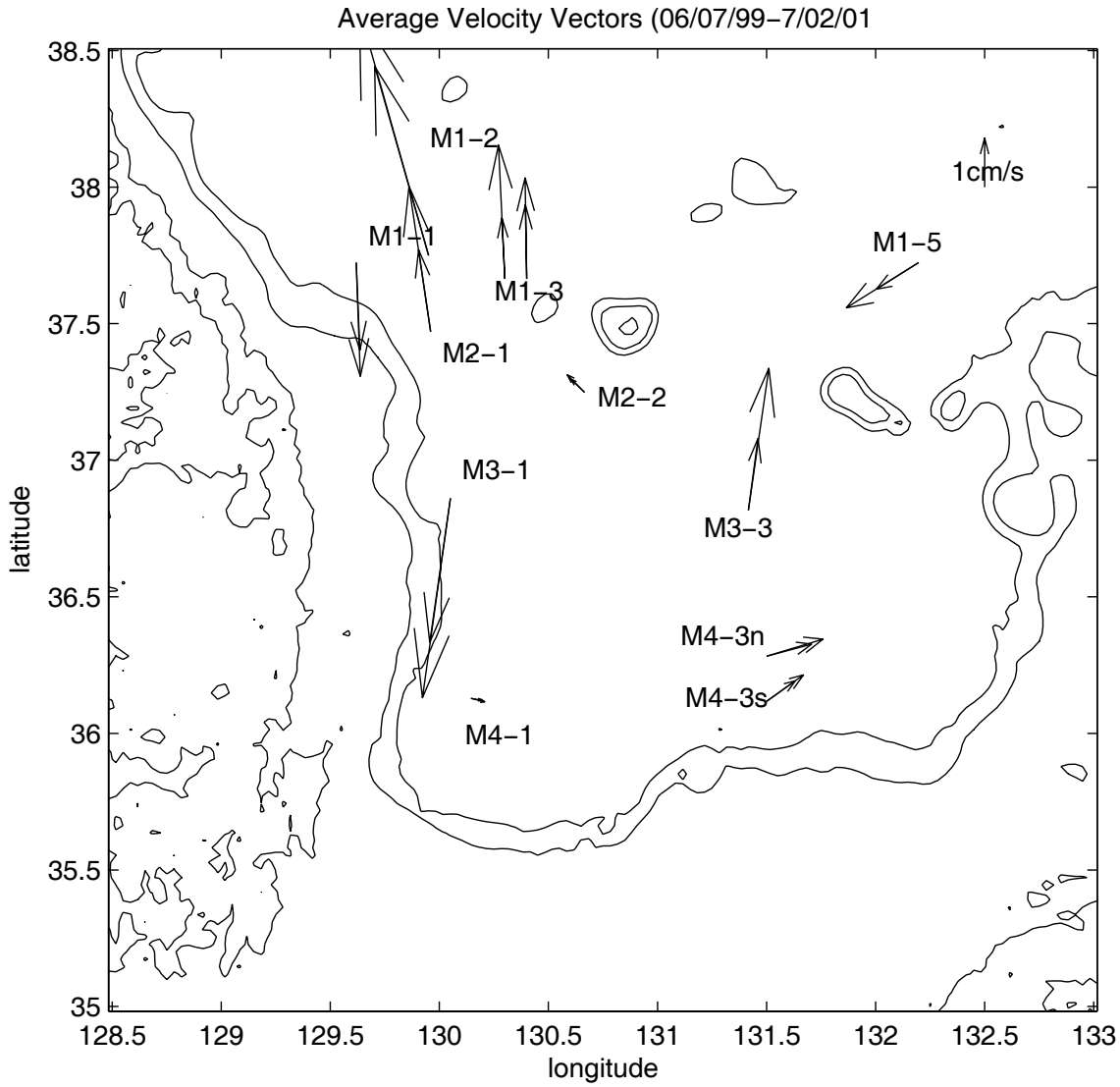


Figure 3: Average velocity vectors from RCM records. For M1-3, vectors on the left side represent the first part of recorded data; vectors on the right side represent the last part of record data. Short Arrows: average velocity vectors after stalls were replaced with spline-fitted values. Long Arrows: average velocity vectors after stalls were excised

3.6 Lowpass Filtering

After the stalls were interpolated, the velocity components were lowpass filtered using two different schemes. The current data were lowpass filtered using a 40-hour cutoff period in order to remove any shorter-period signals including tidal signals still remaining in the data. The data were also lowpass filtered using a 5-day (120 hour) cutoff to remove nongeostrophic signals. The 40-hour lowpassed records are superimposed on the unfiltered data in Figure 5 to Figure 15 . The 120-hour lowpassed records are shown in Figure 16 to Figure 26.

3.6.1 40 hour lowpassed records (40 HRLP)

Prior to filtering, the data were first interpolated to exactly 1 hour time intervals from the first point in each record. The standard library function, DIGITAL_FILTER (Robert, 1984), was used to create the convolution kernel for the 40-hour low-pass filter. The Gibbs parameter was set to a value of 50, a good choice for most filters. The Gibbs Phenomenon variations are oscillations which result from abrupt truncation of the infinite FFT series. Time bases of the filtered time series are identical to those of the unfiltered, hourly records.

3.6.2 120 hour lowpassed records (120 HRLP)

The data were lowpass filtered using a 4th order Butterworth filter with a cutoff period of 120 hours using MATLAB [Krauss et al., 1992]. For this filtering routine, it was not necessary to interpolate the data to 1-hour intervals prior to applying the filter. The filter was passed forward and backward in time to avoid introducing phase shifts. Eighteen hours of data at each end of the filtered series were discarded to avoid startup transients. After filtering, the time series were subsampled at 12 hour intervals, centered on 0000 and 1200 UTC.

4 Basic Statistics

4.1 Data Recovery

Twelve of the thirteen current meters were recovered after the two-year duration of the moored array program. M3-4 was lost because the anchor would not release on recovery. M1-4 was recovered but the battery failed a few hours after deployment due to a manufacturing fault. Nevertheless the data recovery was adequate to meet our objectives of mapping the current and eddy fields. The time line for the data returns is shown in Figure 4.

4.2 First-Order Statistics

The first order statistics of velocity are presented for the recovered instruments. Basic statistics for unfiltered hourly data, 120 HRLP, and 40 HRLP filtered time series data are presented separately in Table 6, Table 7, and Tables 10–25. Table 6 has the basic statistics of hourly data for both stalls spline-fitted (U,V) and stalls excised (U′,V′). M3-4 and M1-4 are not included in the Table. The data set from M1-3 is divided in two parts because of the long period of bad data excised from the middle of data set.

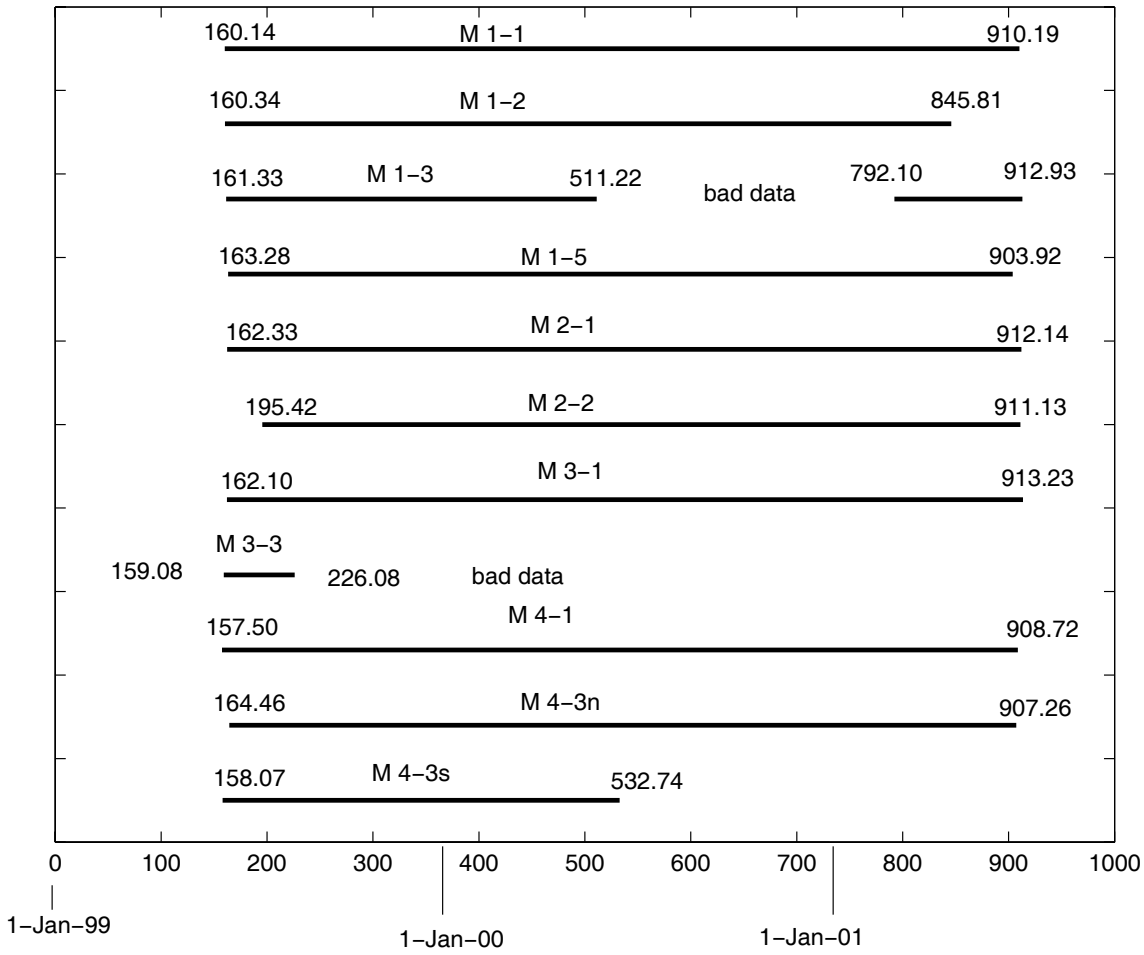


Figure 4: RCM timeline. The good data periods are plotted as solid lines. The start and end times of the good data are labeled. M3-4 was not recovered. Battery on M1-4 failed after a few hours due to a manufacturing fault. These two sites are not included in the chart. Time is in days where January 1, 1999 at 0000 UT is 0.00.

Table 6: Basic statistics of the unfiltered (but detided) hourly data both for stalls spline-fitted (U,V) and for stalls excised (U′,V′)

Site	N	Time Period		Velocity	Min	Max	Mean	Std
		Begin	End		(cm/s)	(cm/s)	(cm/s)	(cm/s)
M1-1	18002	06/10/99 03:23(UT)	06/29/01 04:40(UT)	U	-8.85	8.61	0.09	2.35
				U′	-8.85	8.61	0.10	2.67
				V	-10.67	8.23	-1.61	2.86
				V′	-10.67	8.23	-2.08	3.10
M1-2	16452	06/10/99 08:16(UT)	04/25/01 19:36(UT)	U	-12.47	5.32	-1.23	1.62
				U′	-12.47	5.32	-1.58	1.69
				V	-5.56	16.82	3.46	2.61
				V′	-5.56	16.82	4.48	2.11
M1-3	8398	06/11/99 08:09(UT)	05/26/00 05:18(UT)	U	-6.97	8.50	-0.07	1.41
				U′	-6.97	8.50	-0.15	2.12
				V	-6.06	12.70	1.12	2.11
				V′	-6.06	12.70	2.45	2.61
	2901	03/03/01 02:25(UT)	07/01/01 22:29(UT)	U	-6.87	8.14	-0.03	2.33
				U′	-6.87	8.14	-0.03	2.76
				V	-4.99	8.52	1.35	2.40
				V′	-4.99	8.52	1.85	2.68
M1-5	17776	06/13/99 06:46(UT)	06/22/01 22:09(UT)	U	-13.76	13.19	-0.97	2.76
				U′	-13.76	13.19	-1.66	3.44
				V	-11.86	6.90	-0.49	2.12
				V′	-11.86	6.90	-0.83	2.71
M2-1	17996	06/12/99 08:05(UT)	07/01/01 03:26(UT)	U	-13.37	17.18	-0.28	2.00
				U′	-13.37	17.18	-0.50	2.66
				V	-10.33	20.93	1.50	3.58
				V′	-10.33	20.93	2.67	4.46
M2-2	17177	07/15/99 10:48(UT)	06/30/01 03:10(UT)	U	-9.38	10.81	-0.31	3.16
				U′	-9.38	10.81	-0.39	3.60
				V	-10.47	9.46	0.24	2.79
				V′	-10.47	9.46	0.32	3.17
M3-1	18039	06/12/99 02:22(UT)	07/02/01 15:45(UT)	U	-7.22	5.53	-0.47	1.37
				U′	-7.22	5.53	-0.65	1.57
				V	-9.23	7.03	-2.64	2.45
				V′	-9.23	7.03	-3.65	2.20

Site	N	Time Period		Velocity	Min	Max	Mean	Std
		Begin	End		(cm/s)	(cm/s)	(cm/s)	(cm/s)
M3-3	1609	06/09/99 01:55(UT)	08/15/99 01:56(UT)	U	-5.97	6.94	0.22	1.85
				U′	-5.97	6.94	0.47	2.58
				V	-3.76	9.56	1.31	2.26
				V′	-3.76	9.56	2.60	2.64
M4-1	18030	06/07/99 12:07(UT)	06/27/01 17:28(UT)	U	-7.47	9.00	0.24	2.06
				U′	-7.47	9.00	0.31	2.43
				V	-7.69	9.06	-0.03	2.10
				V′	-7.69	9.06	-0.06	2.37
M4-3n	17829	06/14/99 10:57(UT)	06/26/01 06:20(UT)	U	-8.25	9.83	0.66	2.64
				U′	-8.25	9.83	0.85	2.86
				V	-8.11	8.57	0.38	2.38
				V′	-8.11	8.57	0.48	2.62
M4-3s	8993	06/08/99 01:48(UT)	06/16/00 17:59(UT)	U	-6.87	10.31	1.04	2.59
				U′	-6.60	10.31	1.30	2.74
				V	-6.68	8.47	0.22	2.07
				V′	-6.68	8.47	0.31	2.22

Table 7: Basic Statistics for the 120 HRLP Data

Site	N	Time Period		Velocity	Min	Max	Mean	Std
		Begin	End		(cm/s)	(cm/s)	(cm/s)	(cm/s)
M1-1	1495	06/11/99	06/27/01	U	-4.94	4.37	0.09	1.22
				V	-7.55	5.83	-1.61	2.03
M1-2	1307	06/12/99	04/24/01	U	-5.97	1.50	-1.29	1.12
				V	-1.22	10.72	3.62	2.13
M1-3	709	06/13/99	06/01/00	U	-4.16	2.54	-0.07	0.80
				V	-2.54	8.10	1.11	1.62
	239	03/03/01	06/30/01	U	-5.51	3.60	-0.02	1.80
				V	-3.44	5.31	1.36	1.94
M1-5	1477	06/14/99	06/21/01	U	-10.10	7.62	-0.97	2.47
				V	-8.36	5.46	-0.49	1.76
M2-1	1494	06/14/99	06/29/01	U	-10.20	13.18	-0.28	1.64
				V	-7.22	17.26	1.51	3.24
M2-2	1402	07/17/99	06/28/01	U	-6.64	8.90	-0.31	2.26
				V	-6.28	5.87	0.26	1.71
M3-1	1498	06/13/99	07/01/01	U	-3.96	1.42	-0.48	0.73
				V	-7.99	2.38	-2.65	2.08
M3-3	104	06/10/99	08/13/99	U	-3.08	3.96	0.23	1.59
				V	-0.55	6.63	1.54	1.85
M4-1	1498	06/09/99	06/26/01	U	-2.44	3.37	0.24	0.87
				V	-3.86	3.13	-0.03	0.89
M4-3n	1481	06/16/99	06/25/01	U	-4.81	6.03	0.66	1.84
				V	-4.13	5.55	0.38	1.49
M4-3s	745	06/09/99	06/15/00	U	-3.82	7.90	1.03	1.91
				V	-2.67	7.01	0.23	1.23

5 Hourly and 40 HRLP Time Series

Figures 5–15 display the hourly detided data and 40 HRLP time series for each instrument in bimonthly data frames. The two time series for each velocity component at each instrument are superimposed on one another. A common time scale is used. On the time axis, both date and decimal day are indicated. The velocity scale is from -14 cm s^{-1} to 21 cm s^{-1} in all frames.

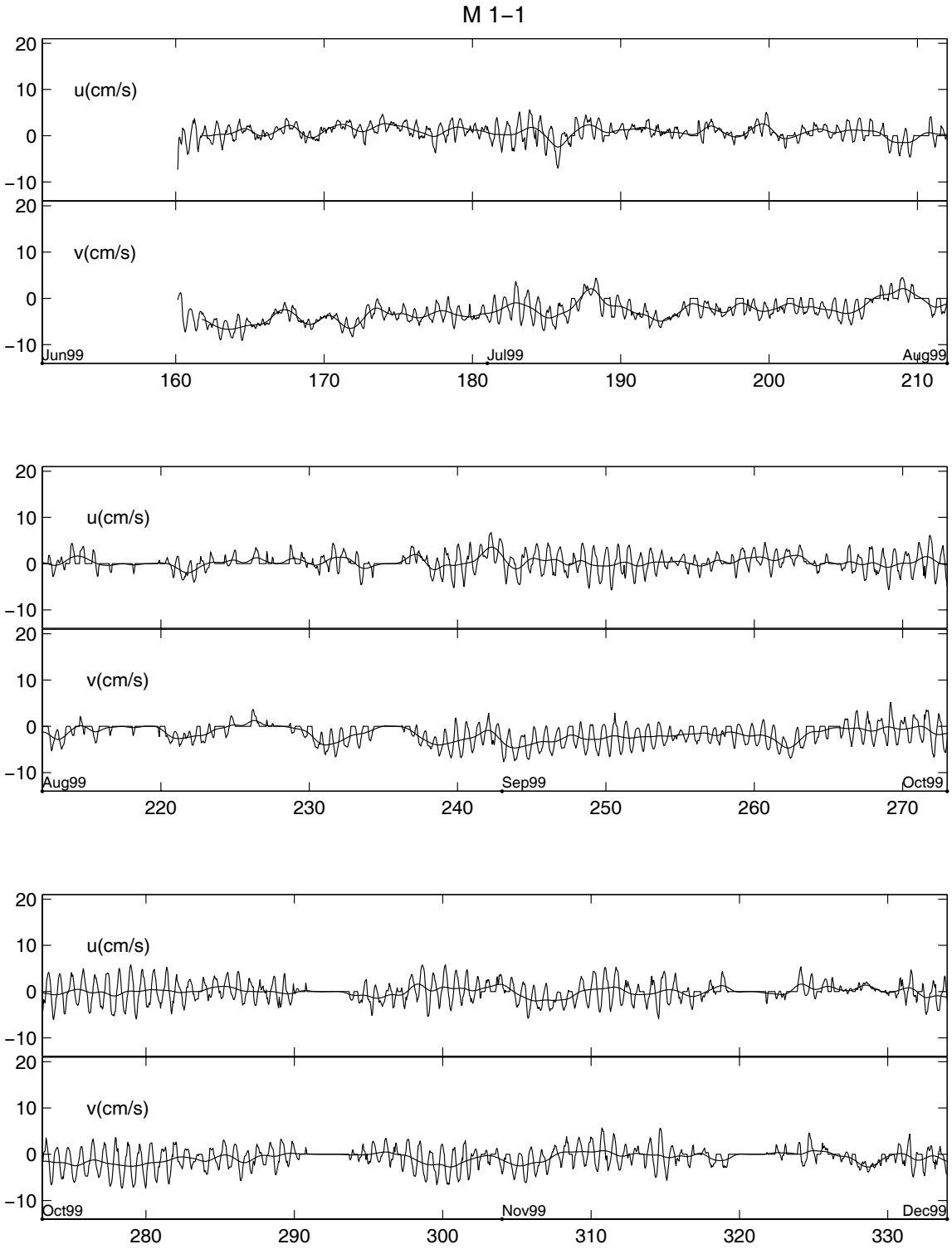


Figure 5: M1-1 Hourly and 40 HRLP Velocities

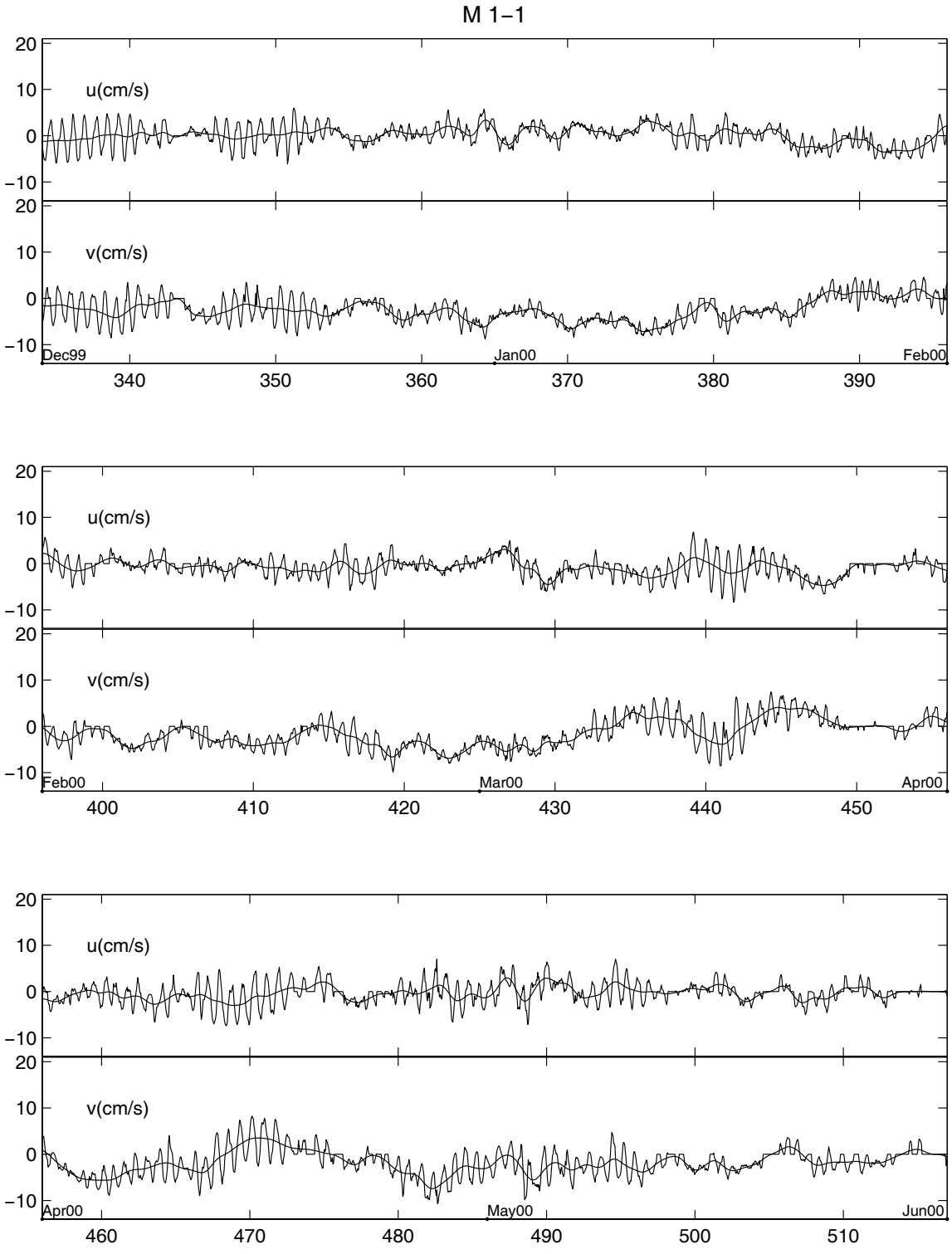


Figure 5: continued

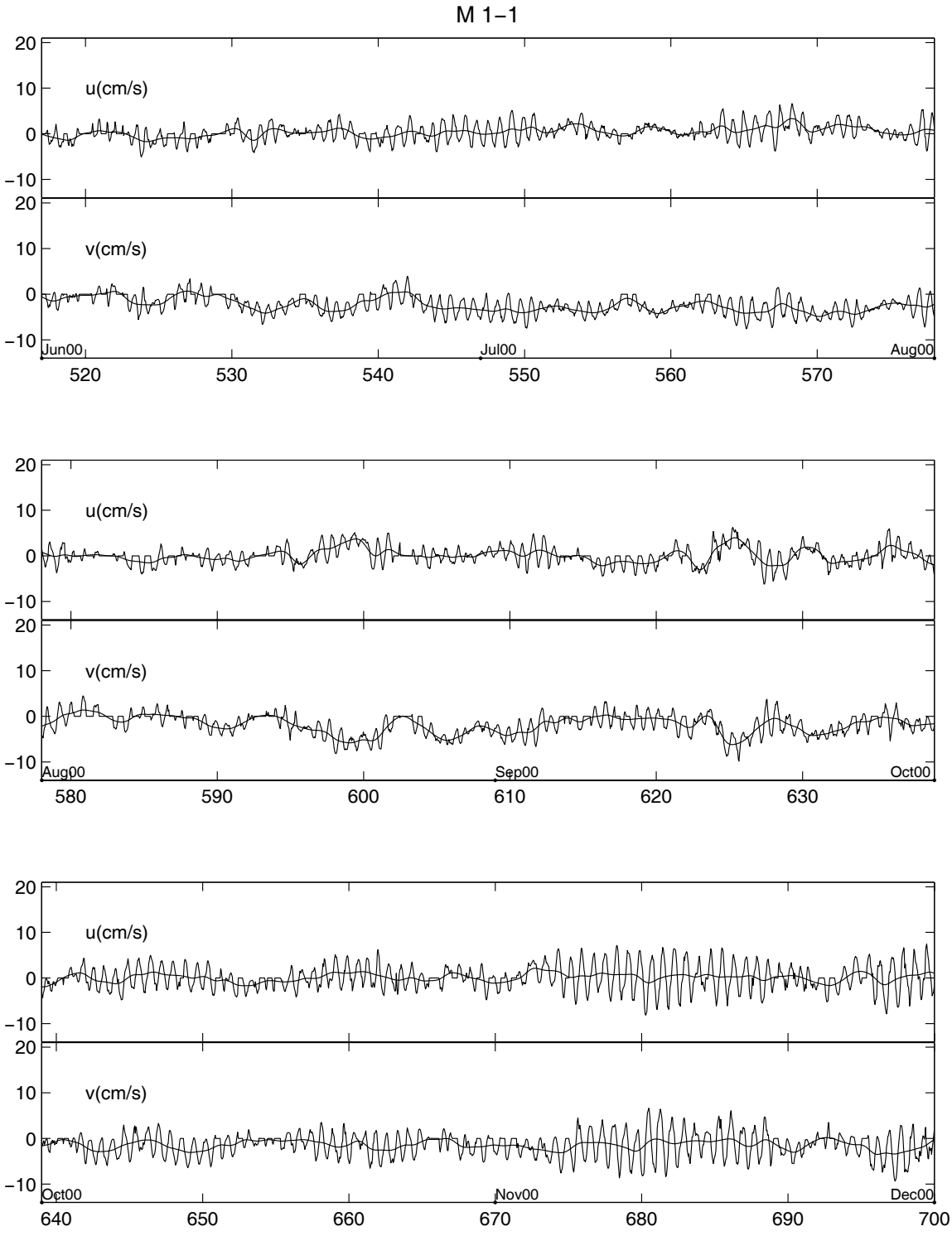


Figure 5: continued

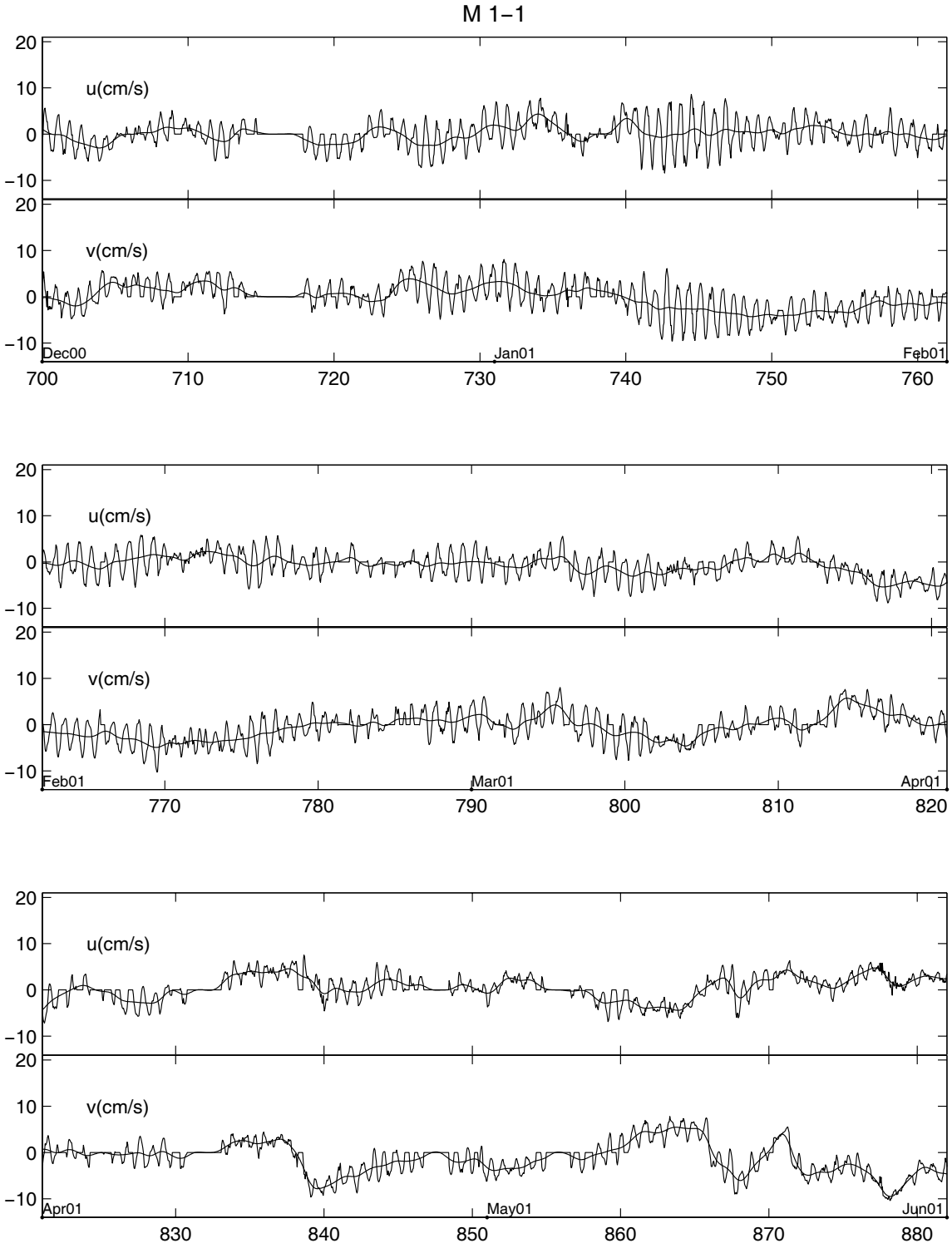


Figure 5: continued

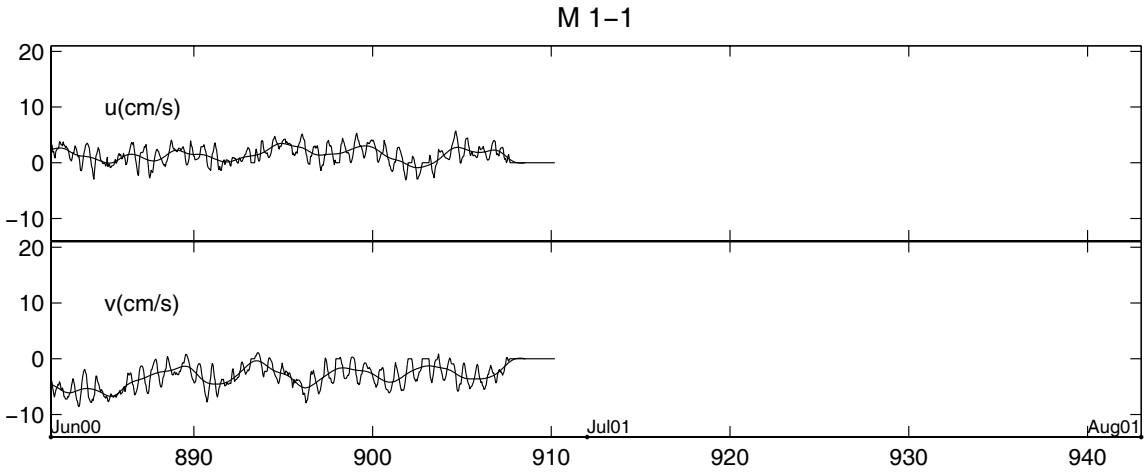


Figure 5: continued

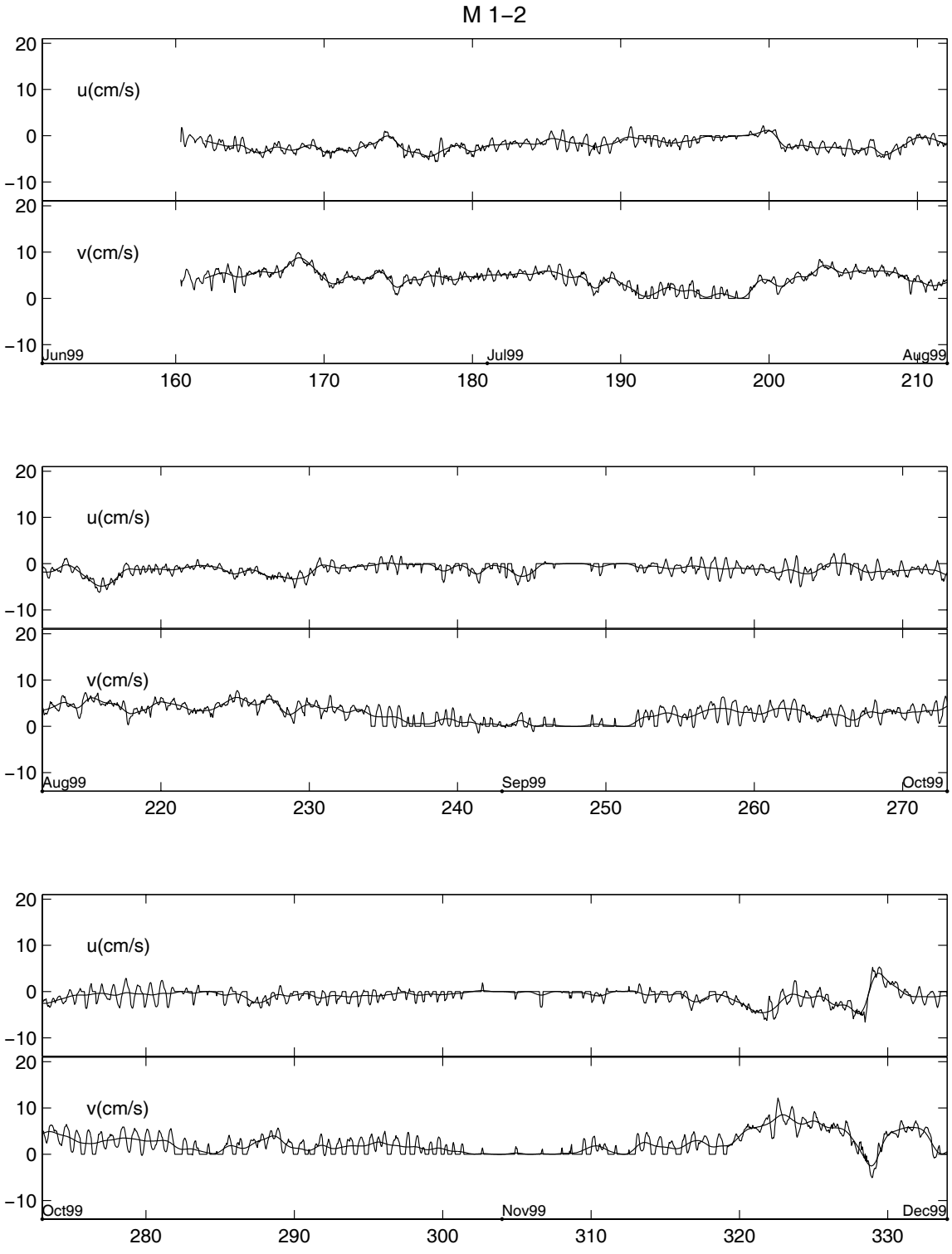


Figure 6: M1-2 Hourly and 40 HRLP Velocities

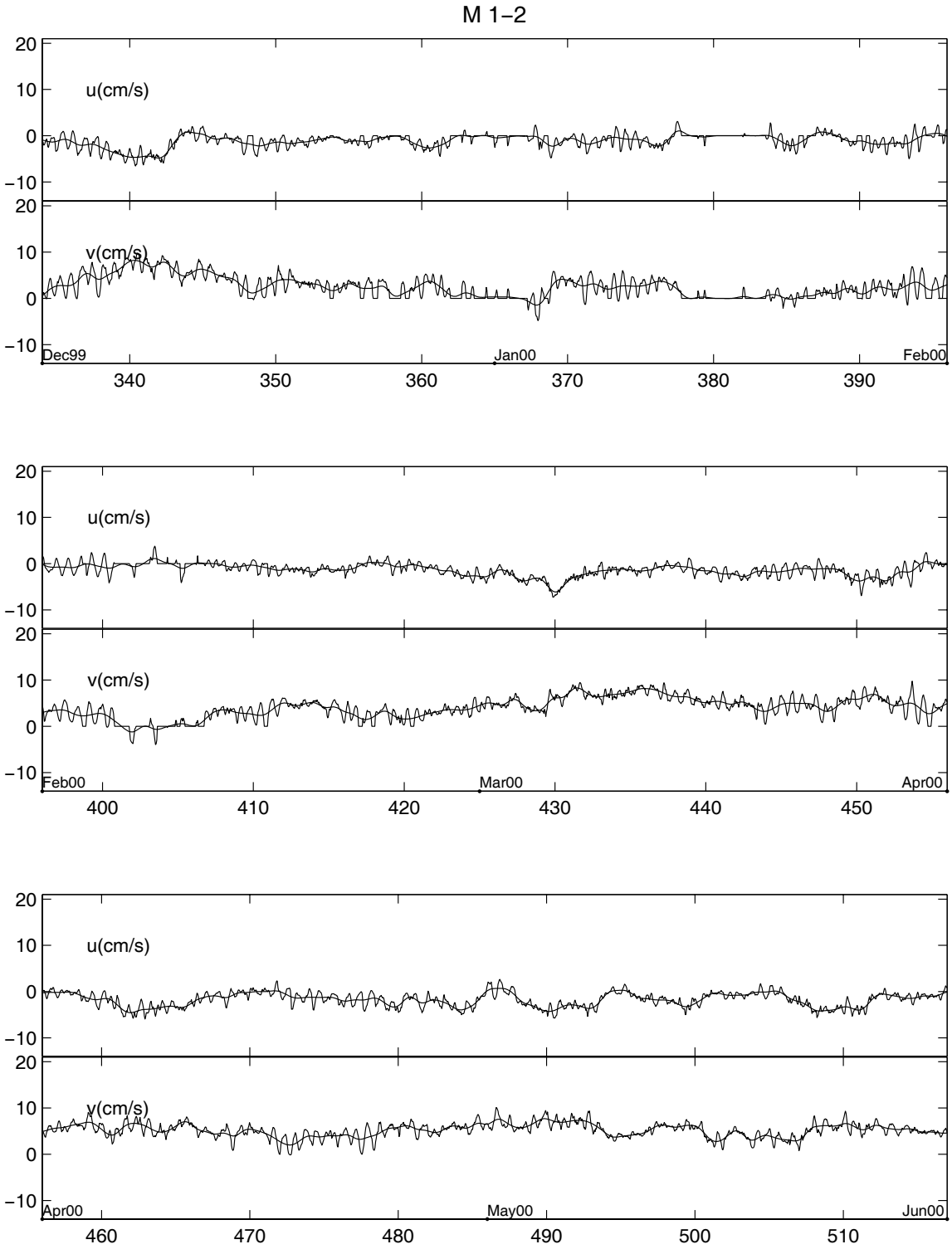


Figure 6: continued

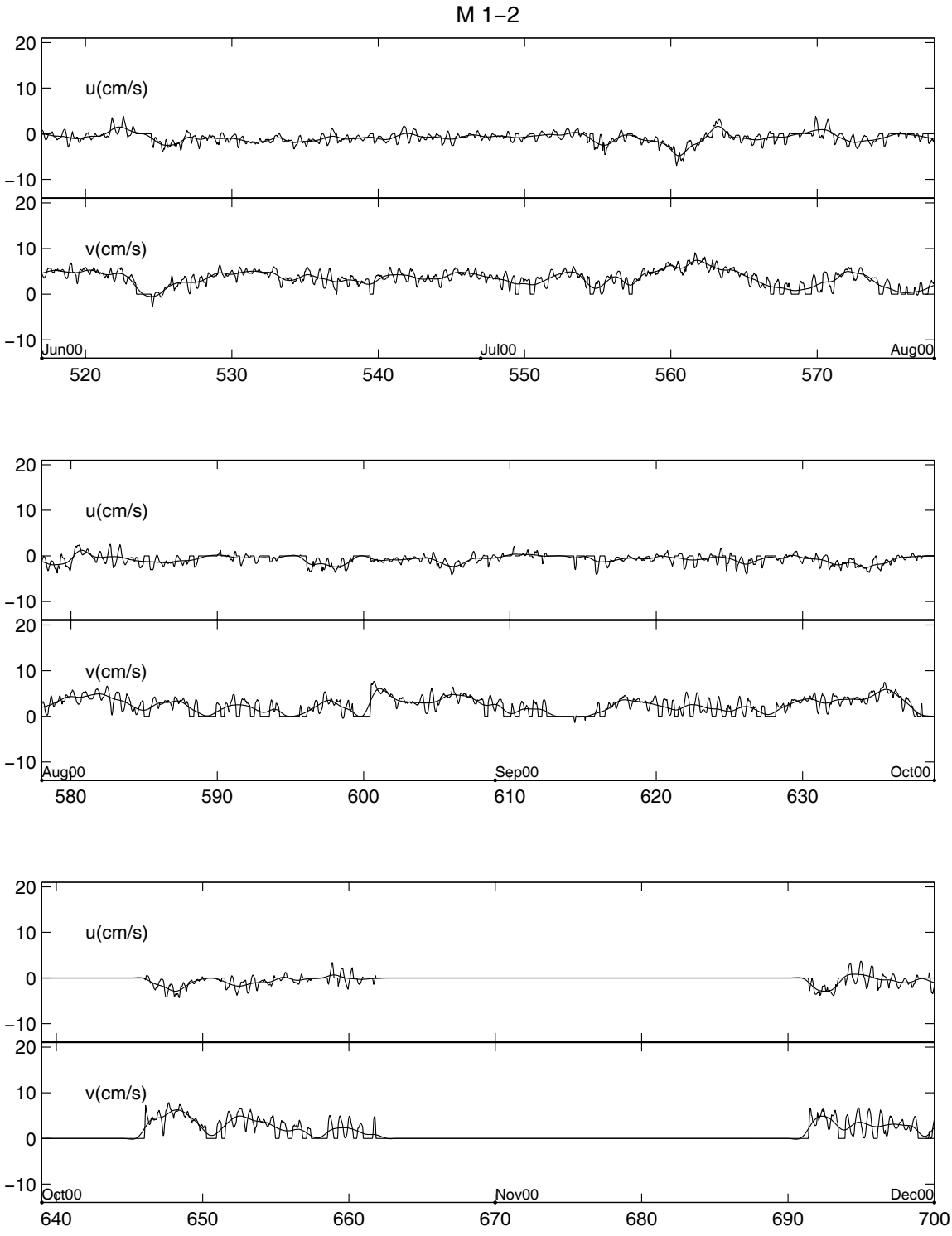


Figure 6: continued

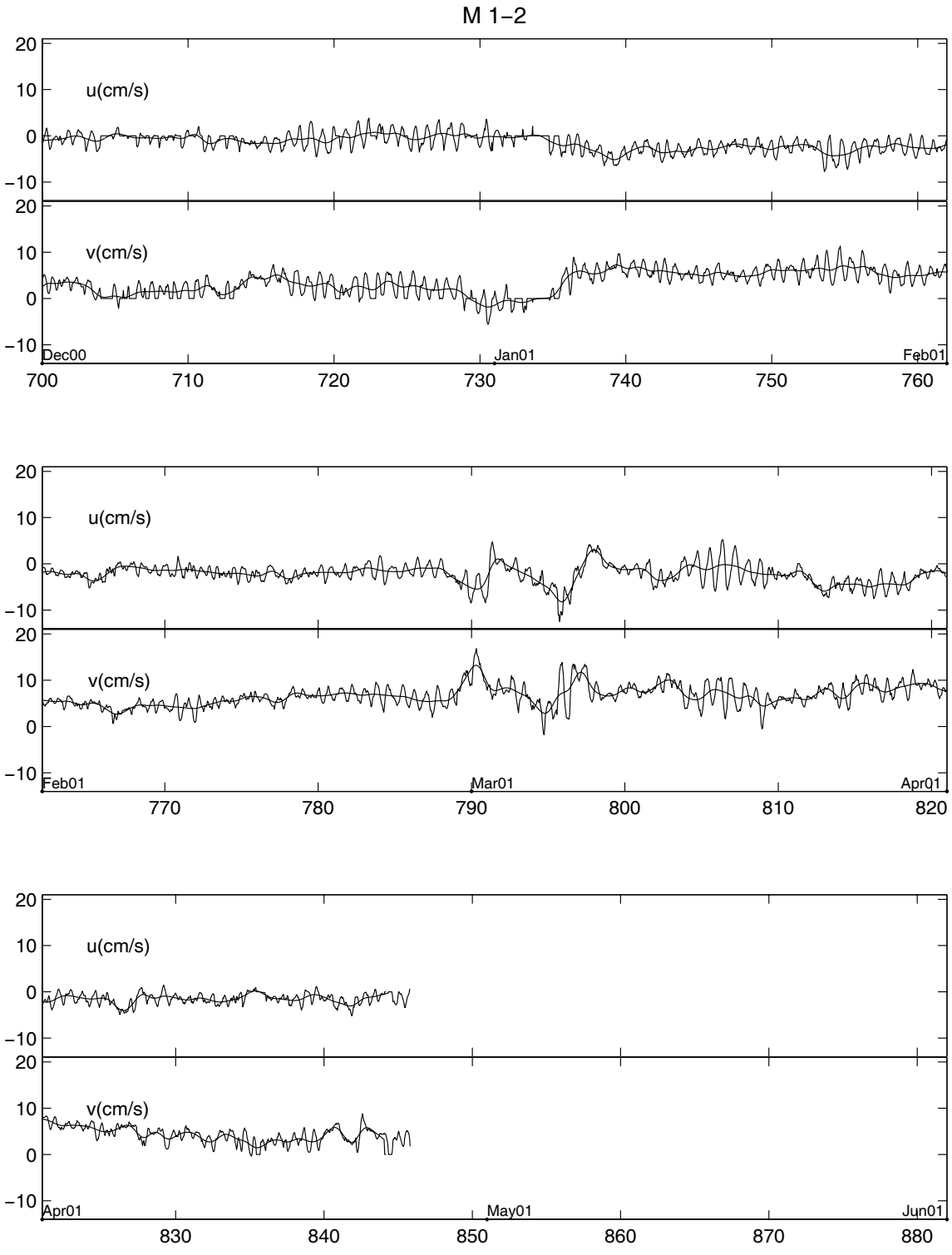


Figure 6: continued

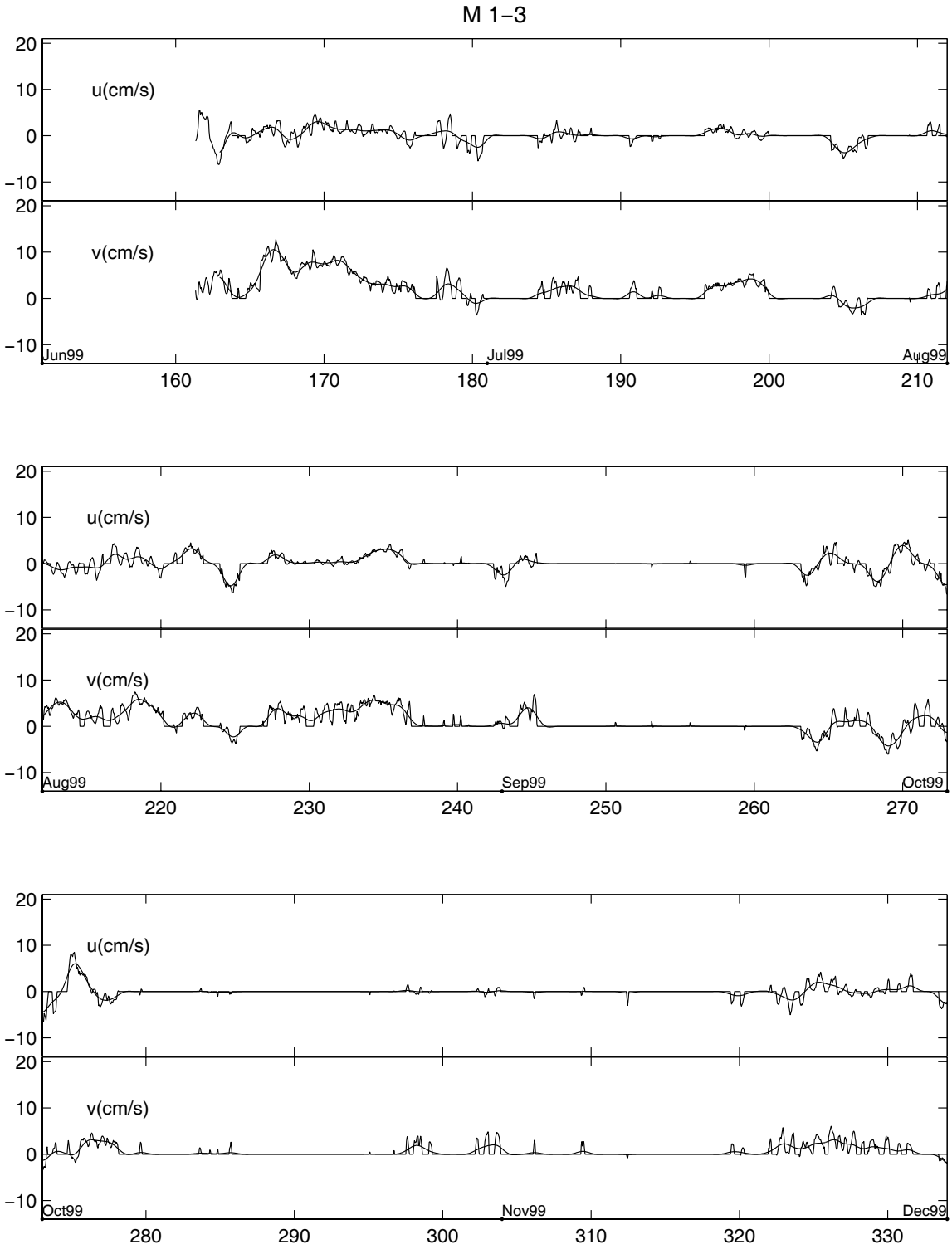


Figure 7: M1-3 Hourly and 40 HRLP Velocities

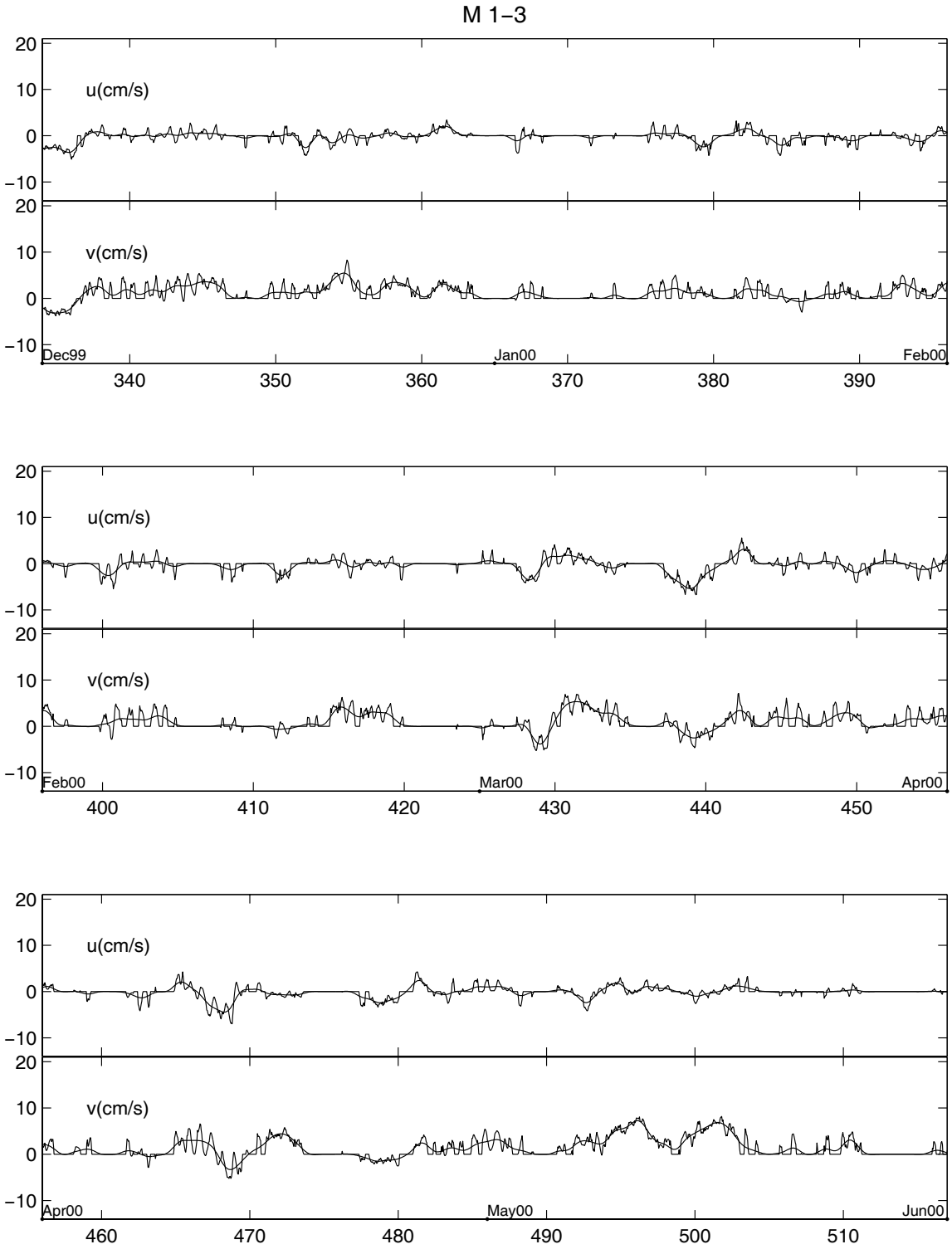


Figure 7: continued

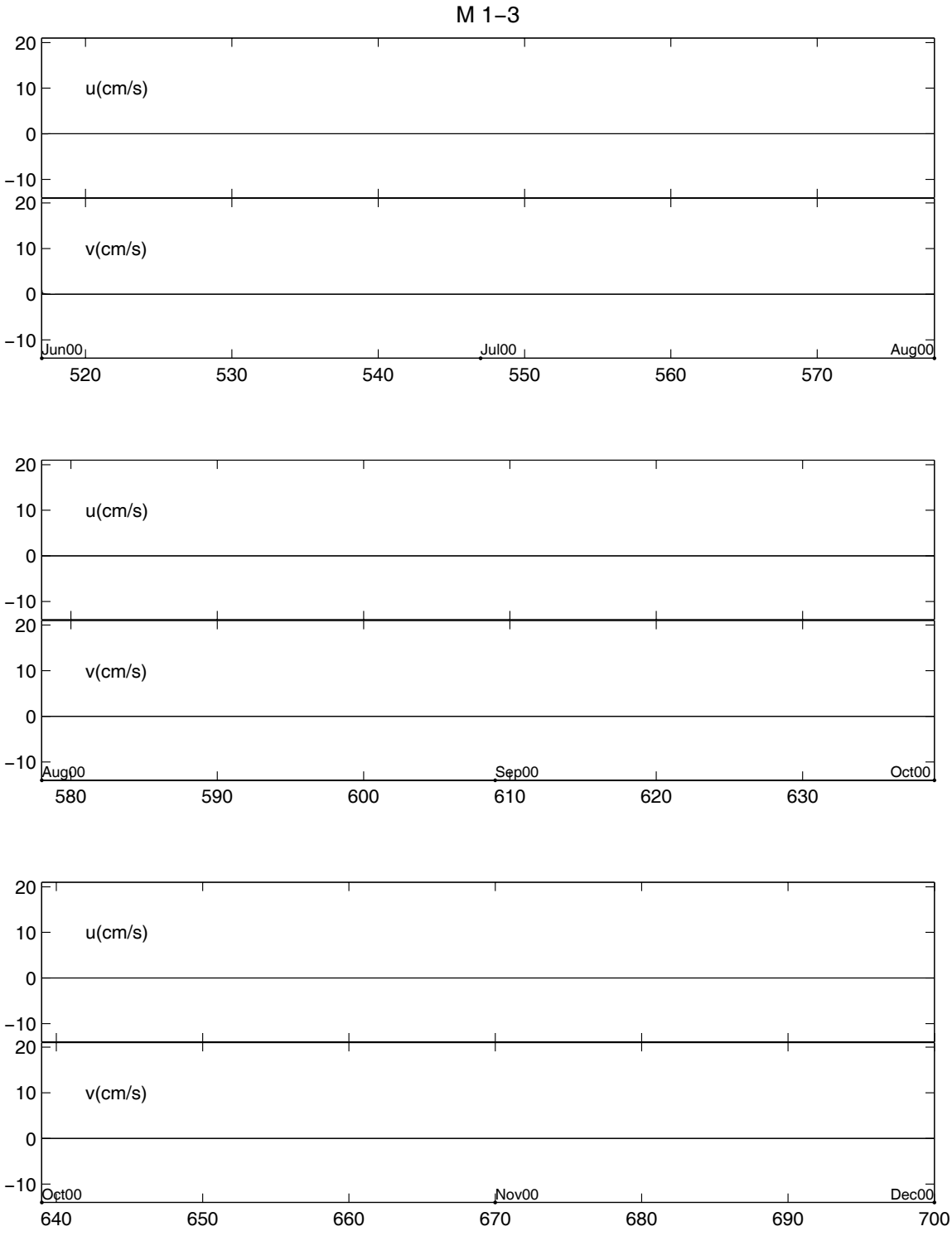
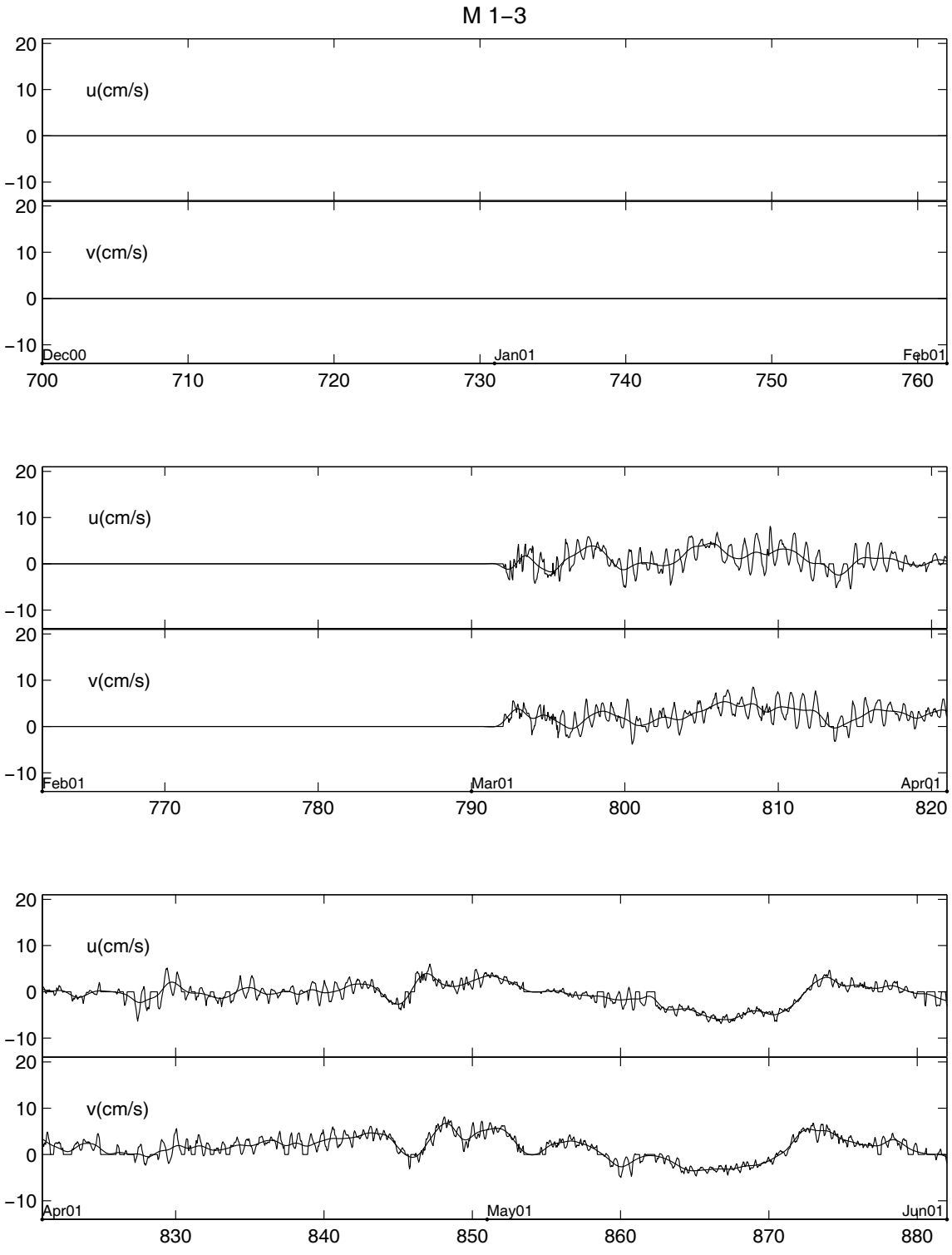


Figure 7: continued



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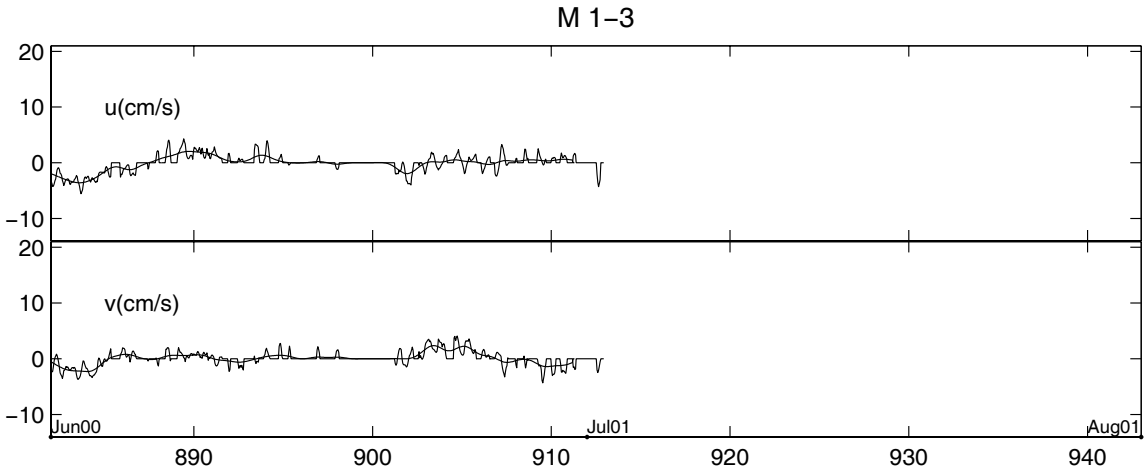


Figure 7: continued

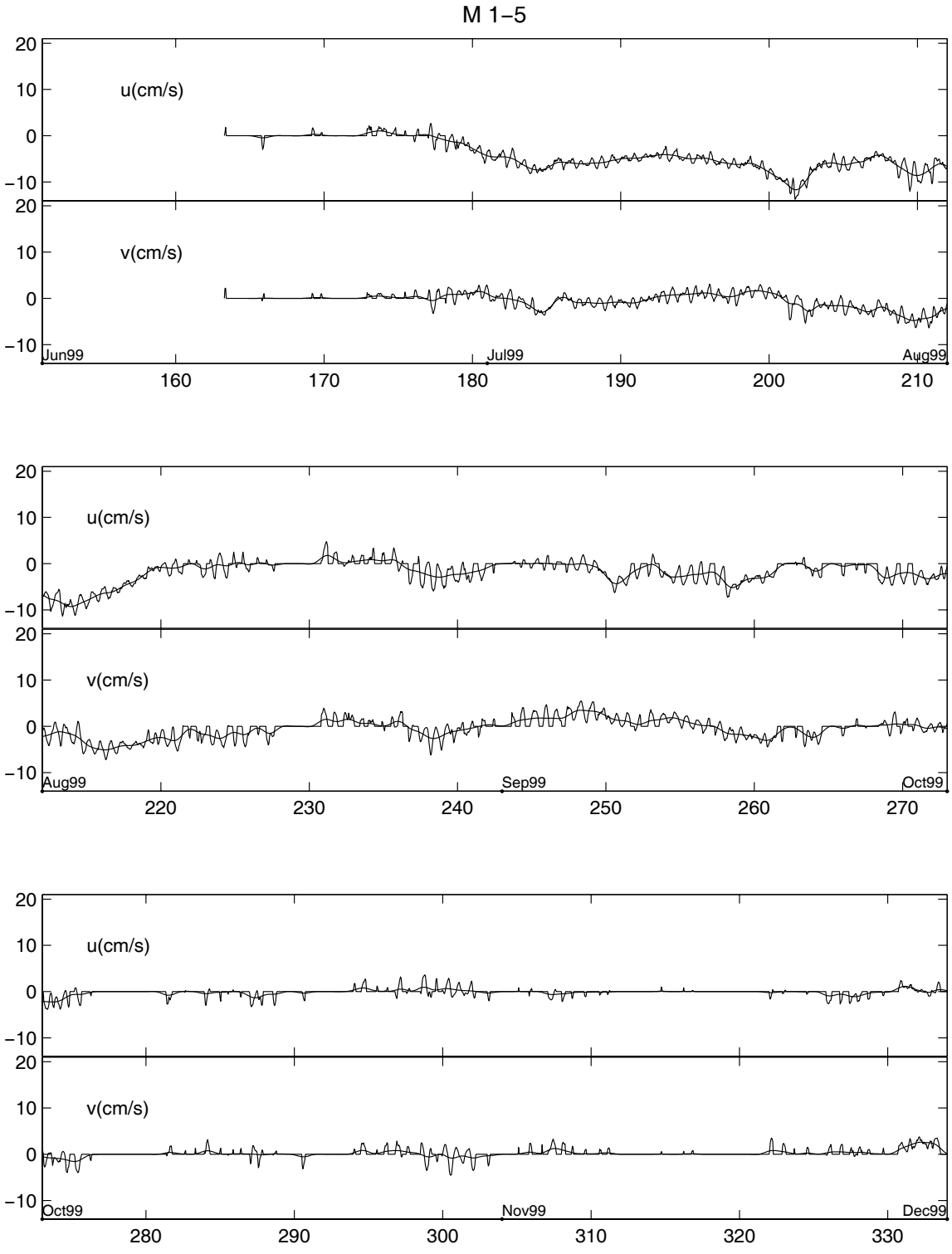
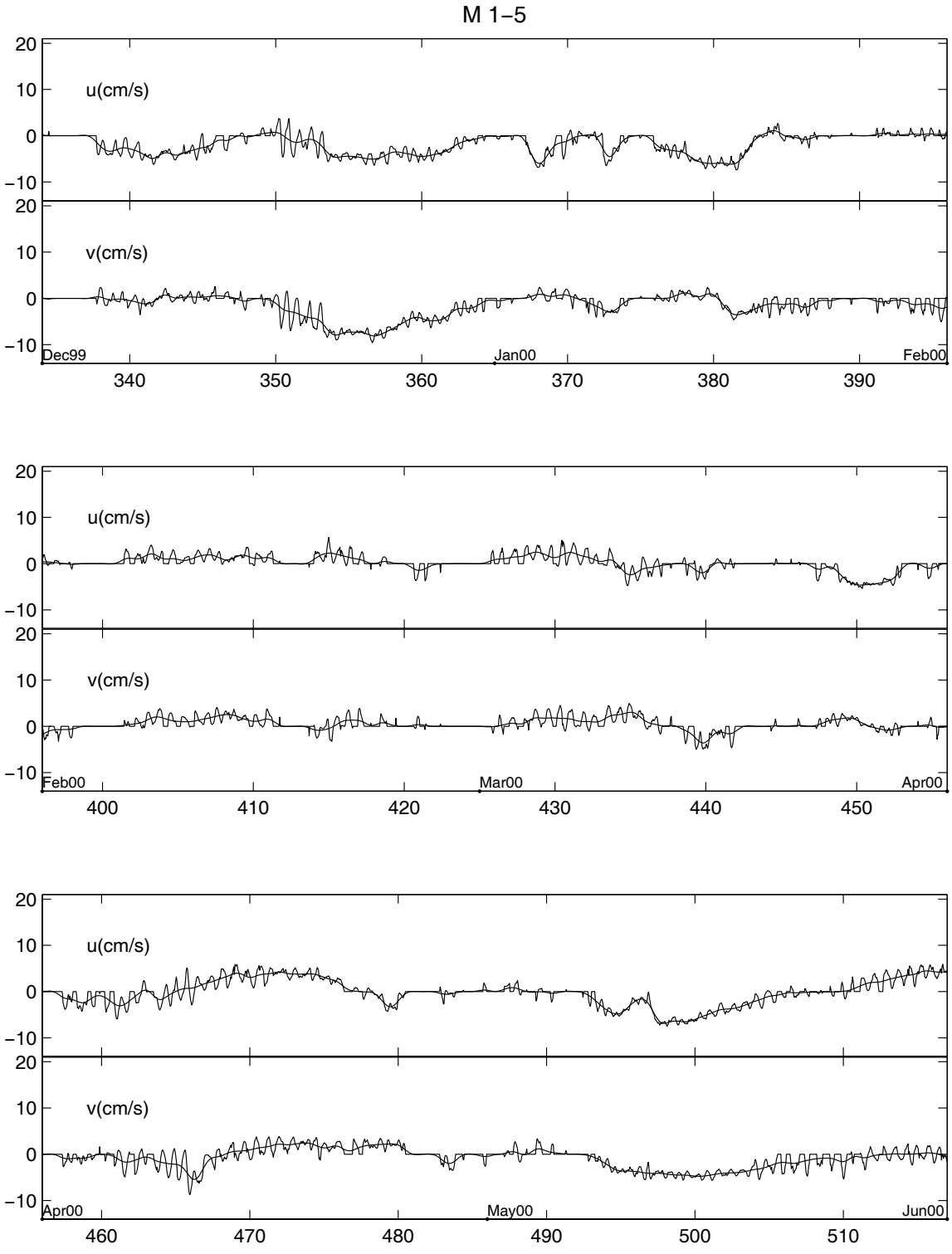


Figure 8: M1-5 Hourly and 40 HRLP Velocities



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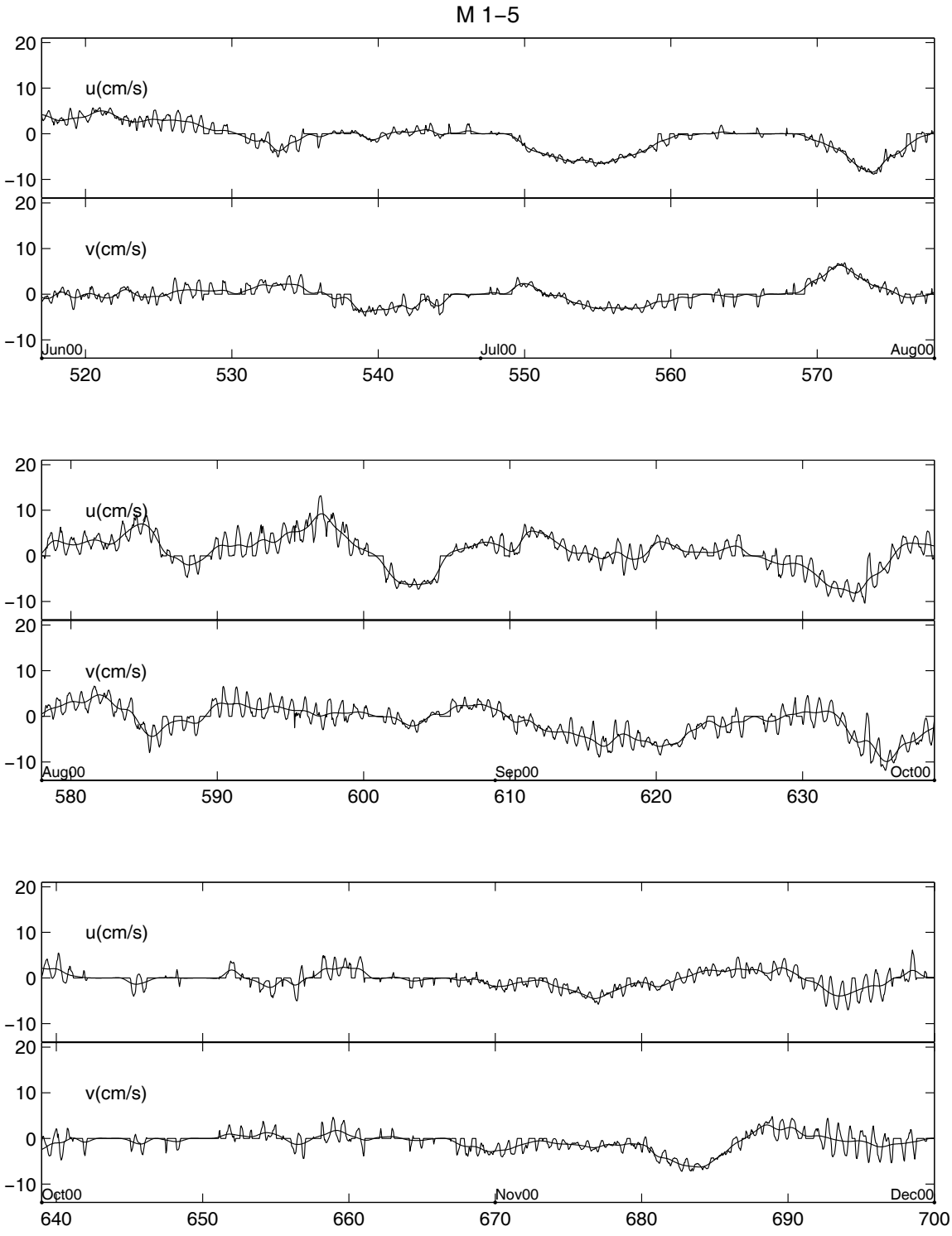

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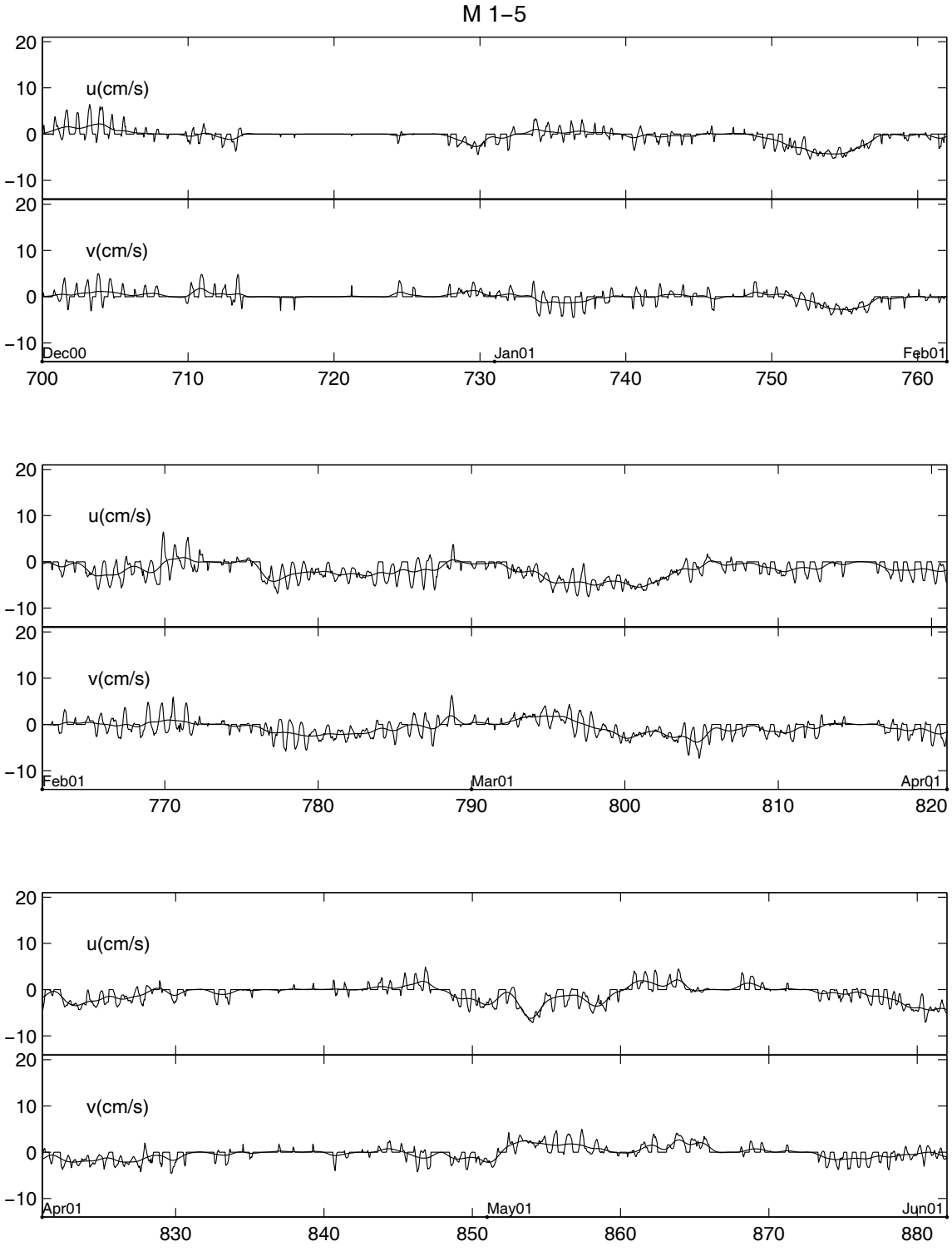

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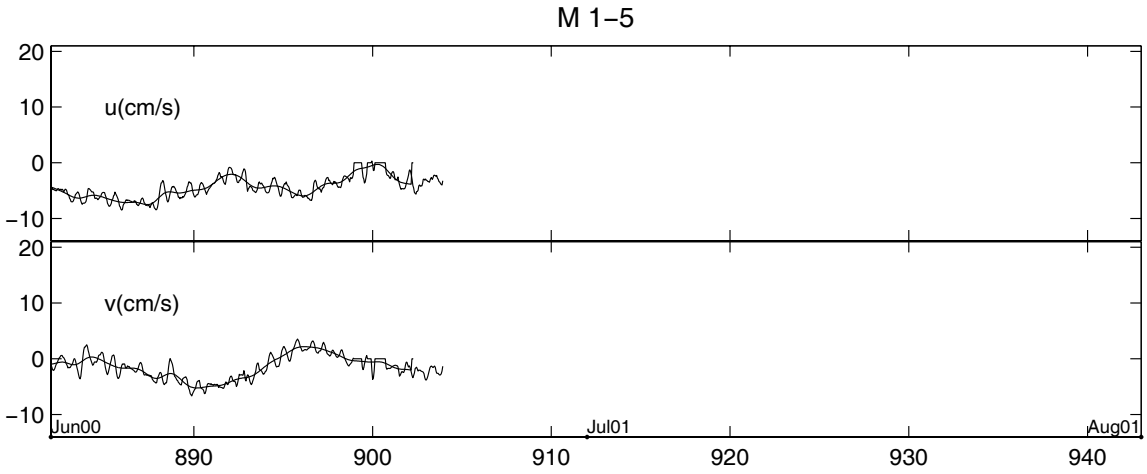

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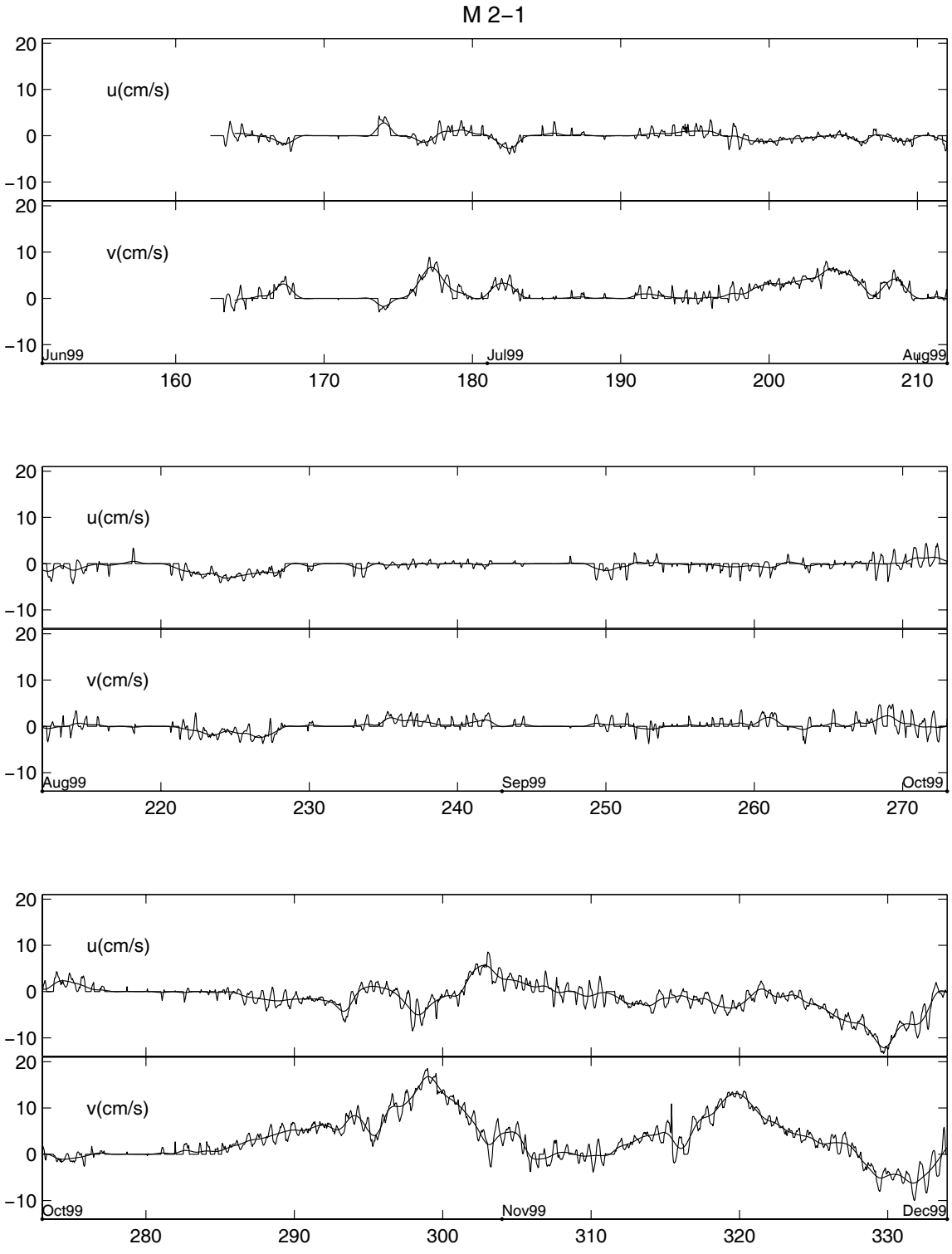
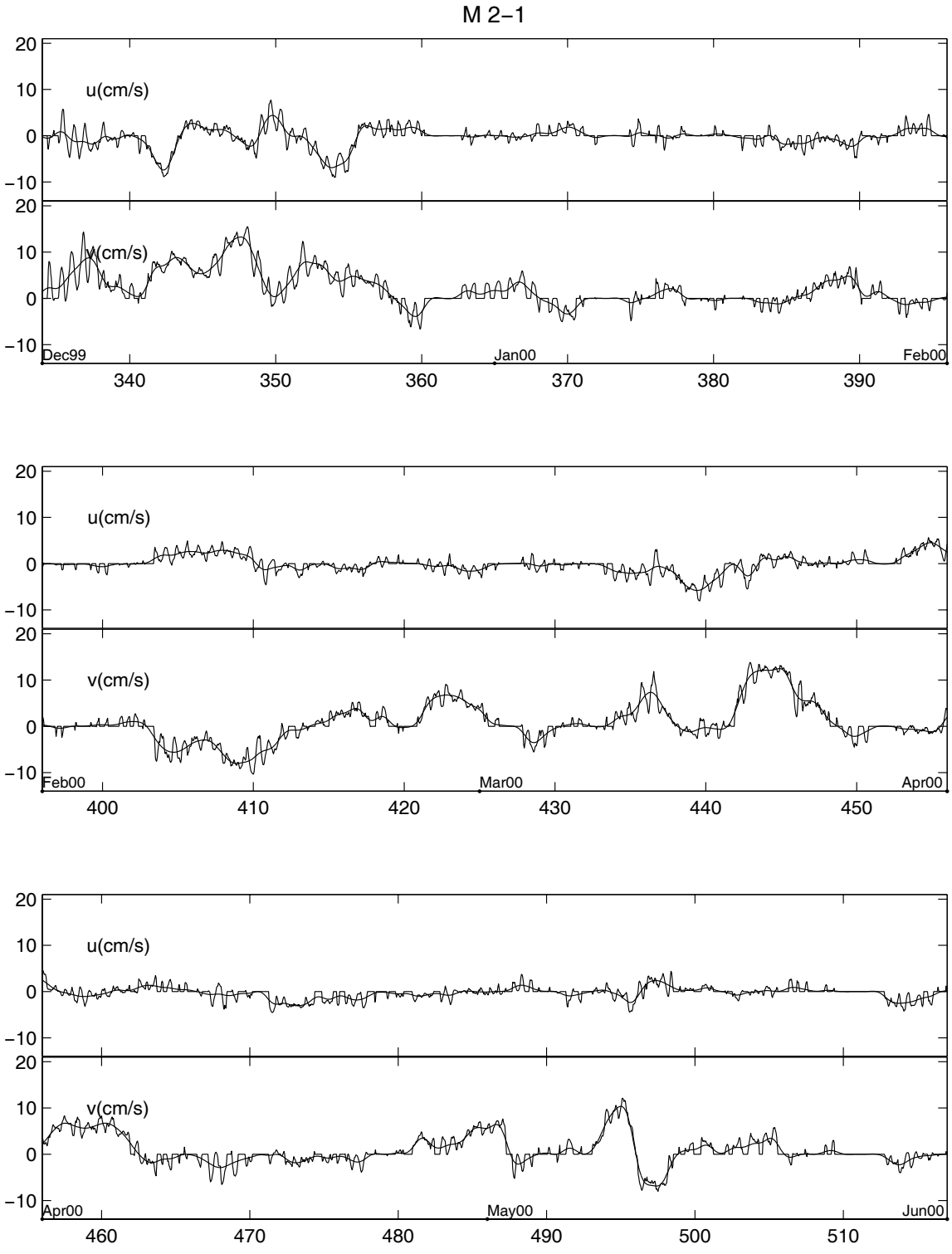


Figure 9: M2-1 Hourly and 40 HRLP Velocities



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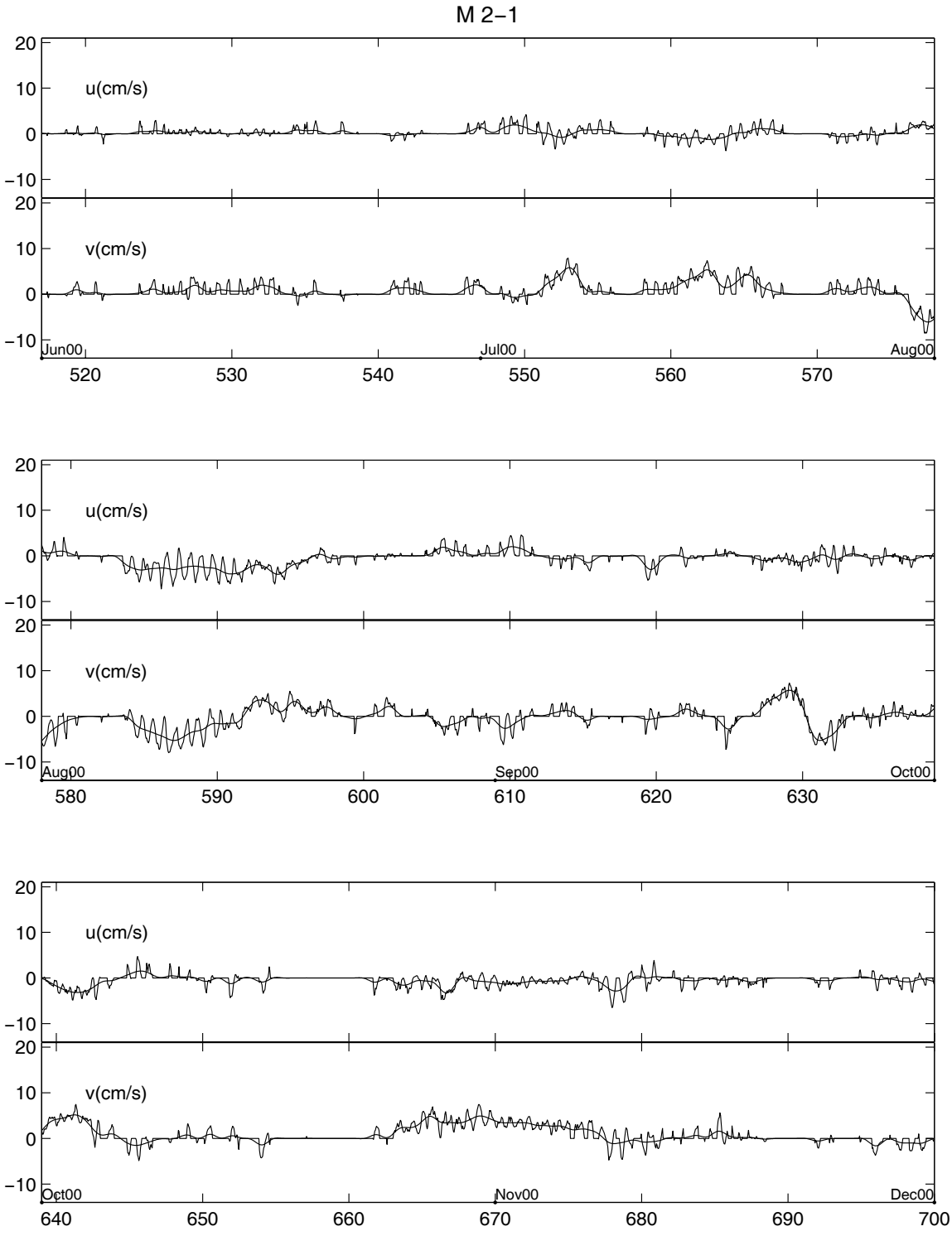

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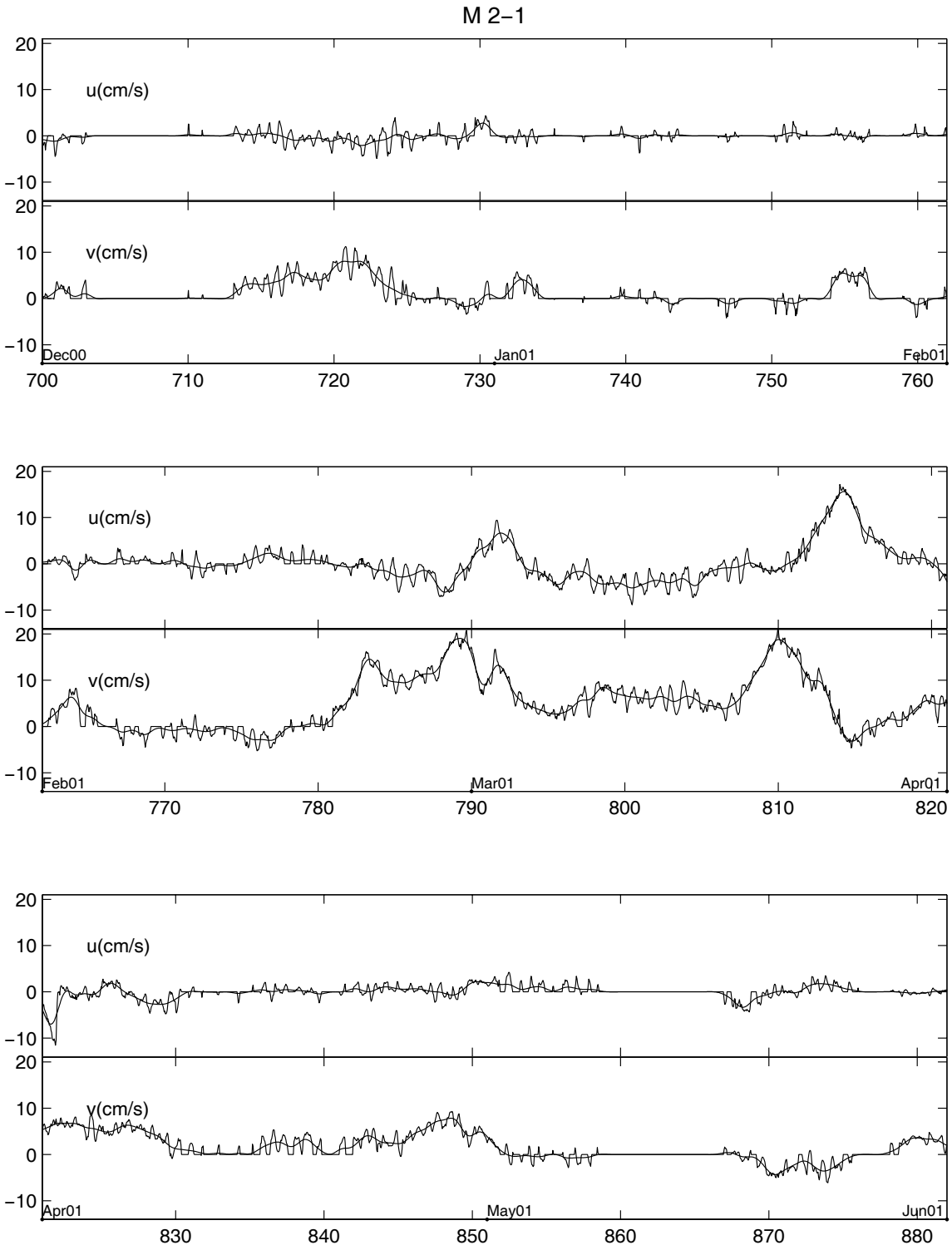
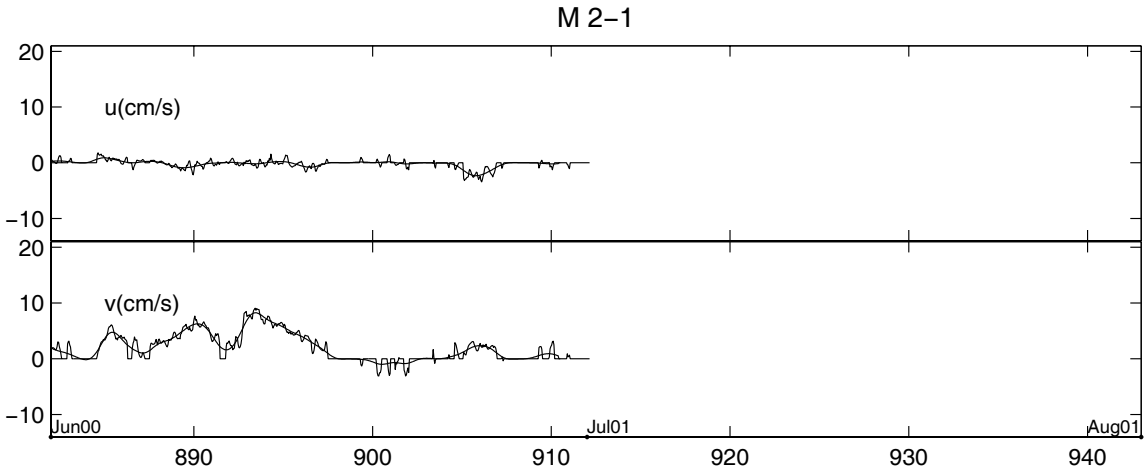


Figure 9: continued



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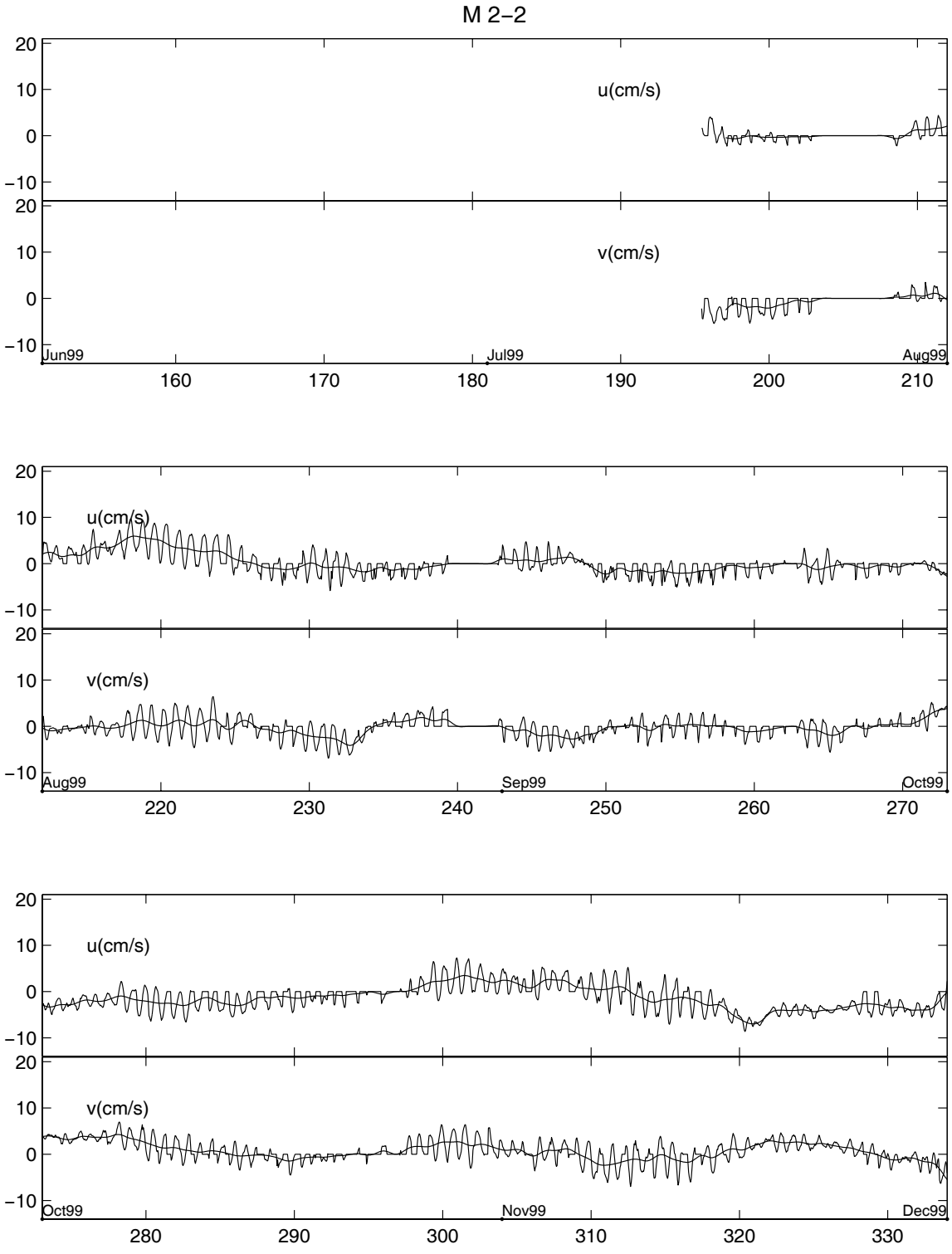
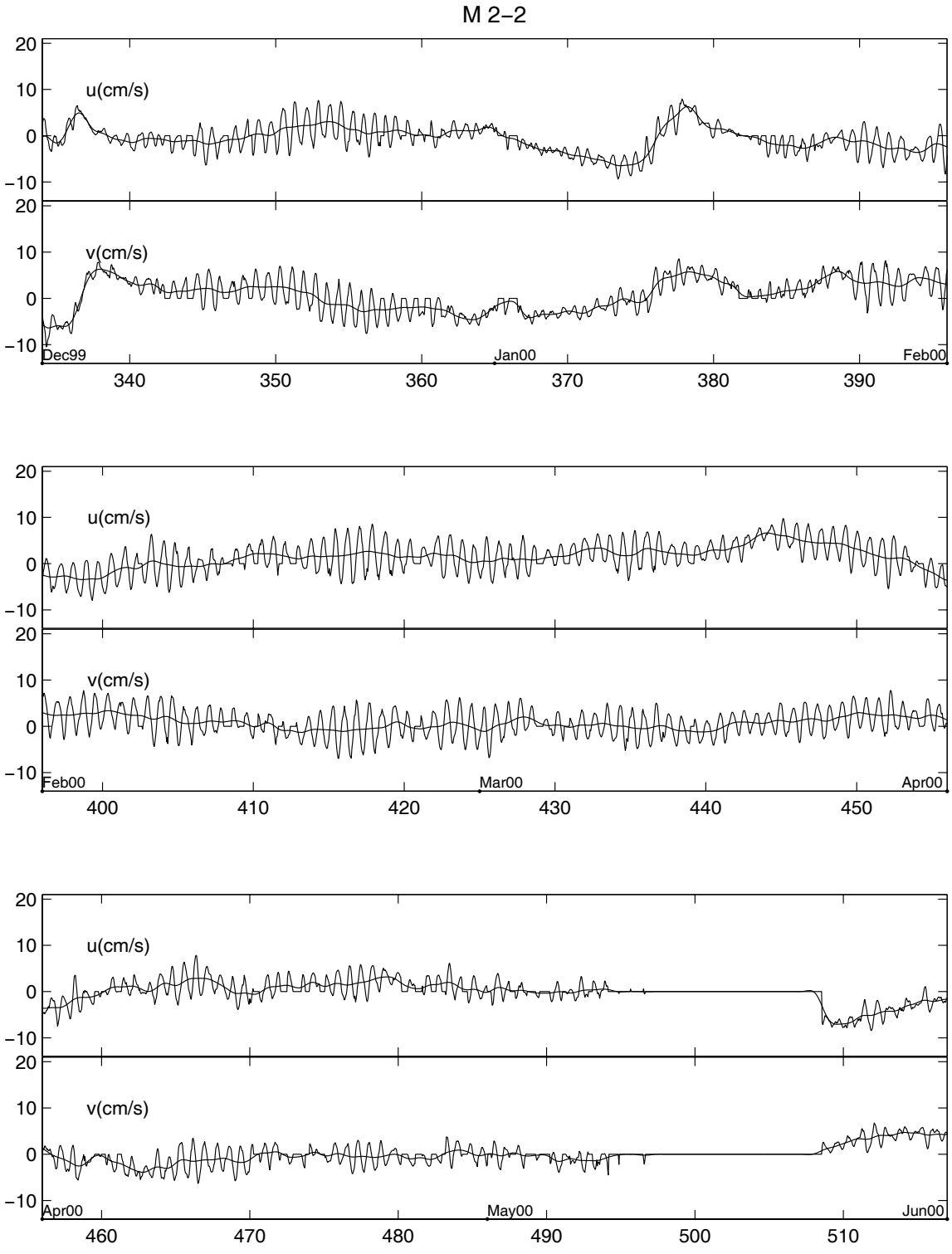


Figure 10: M2-2 Hourly and 40 HRLP Velocities



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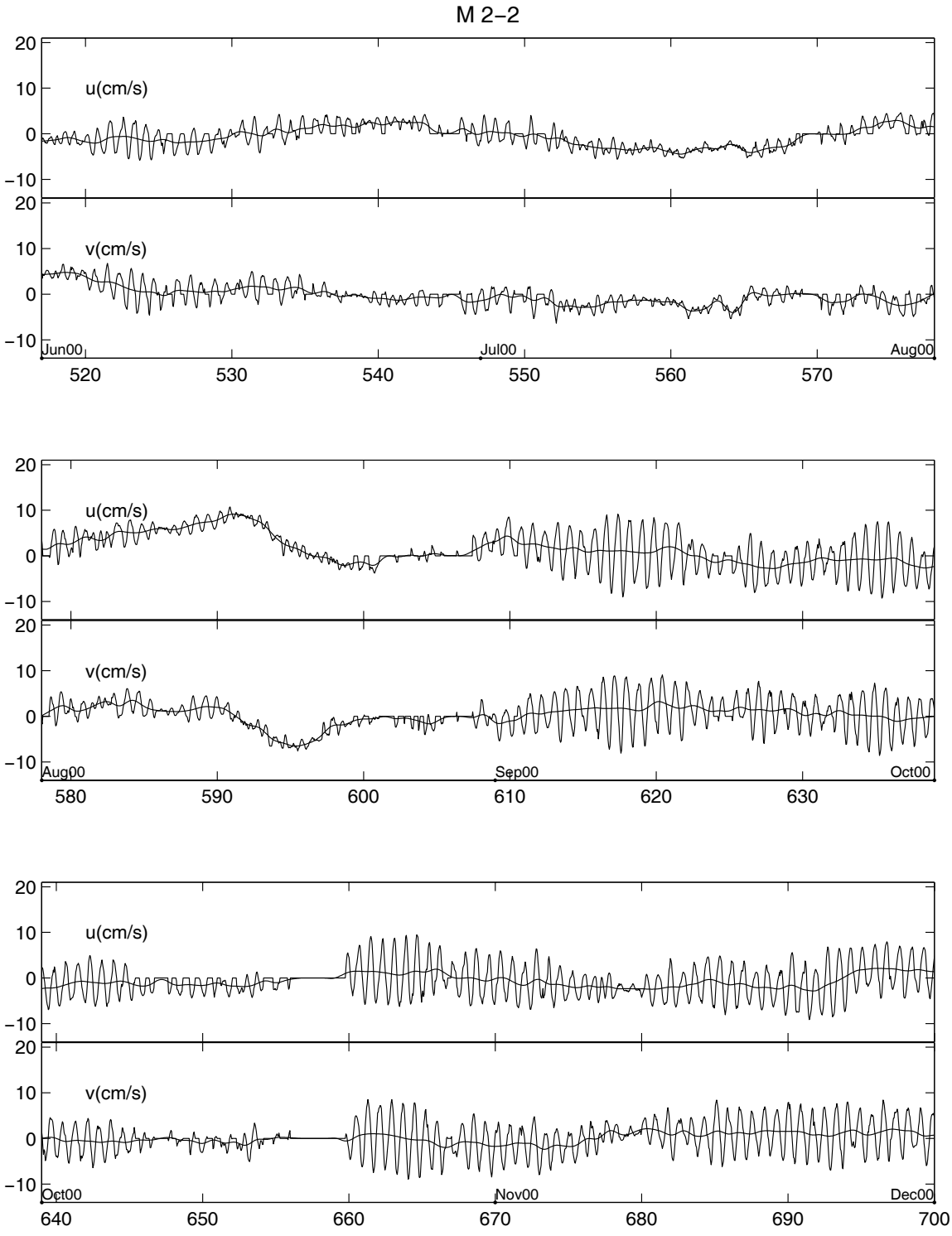

Figure 10: continued

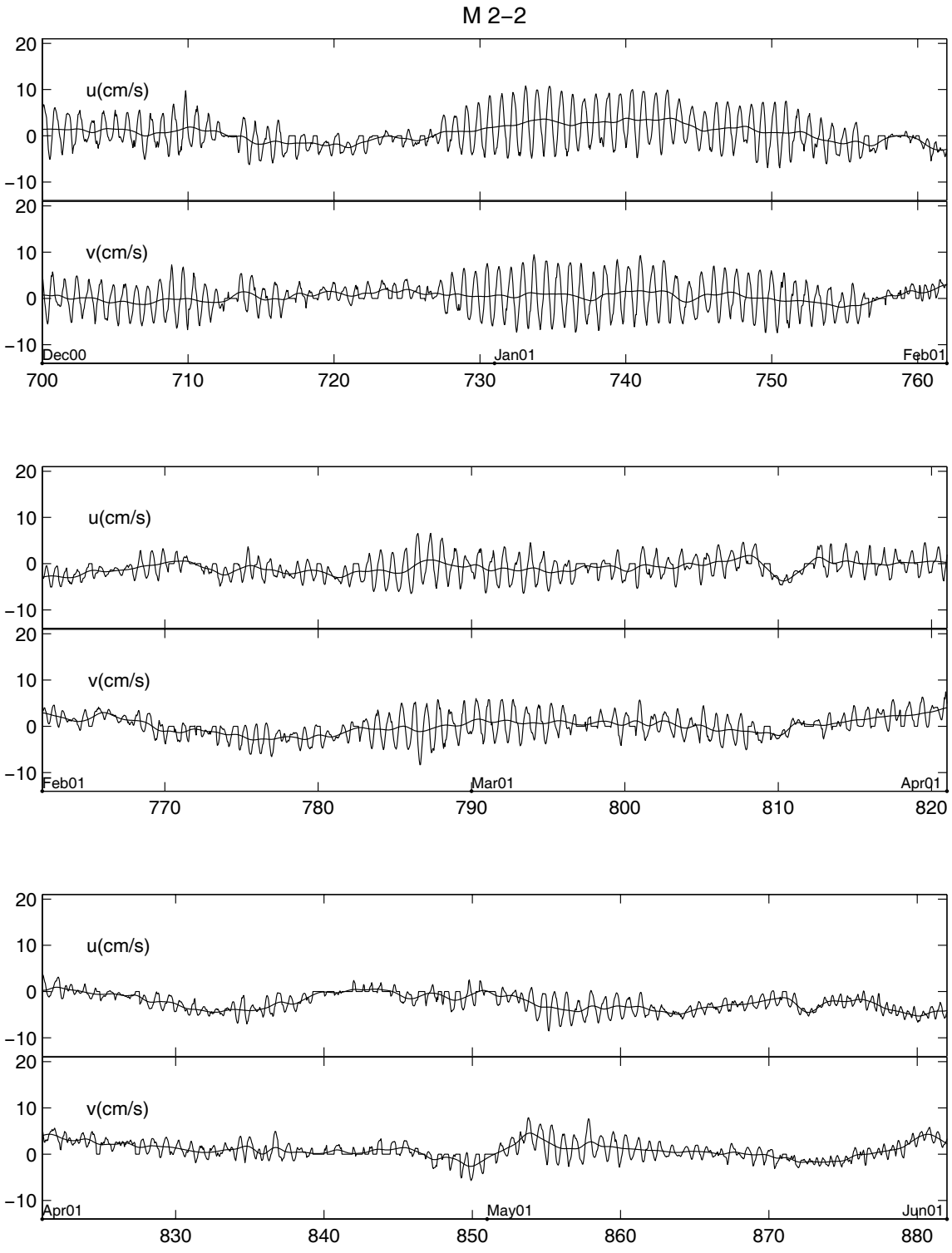

Figure 10: continued

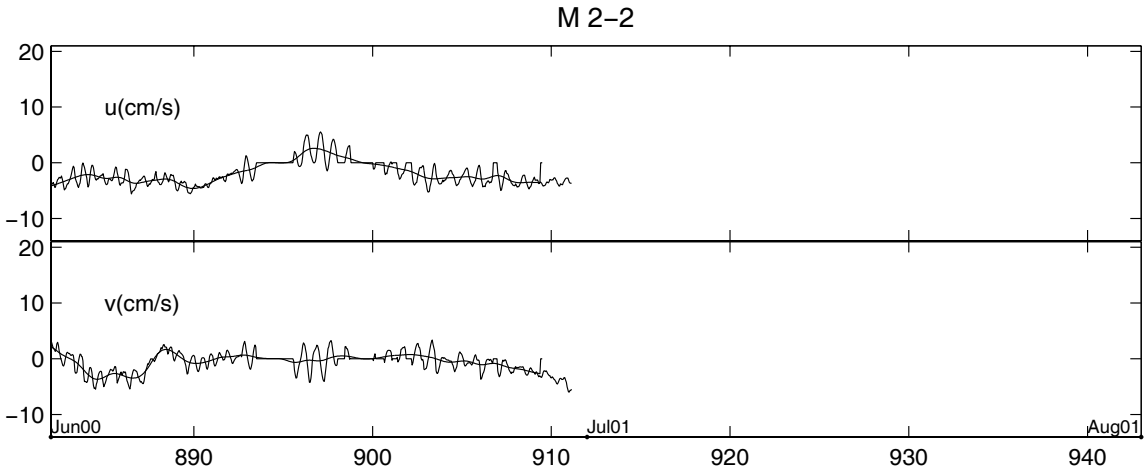

Figure 10: continued

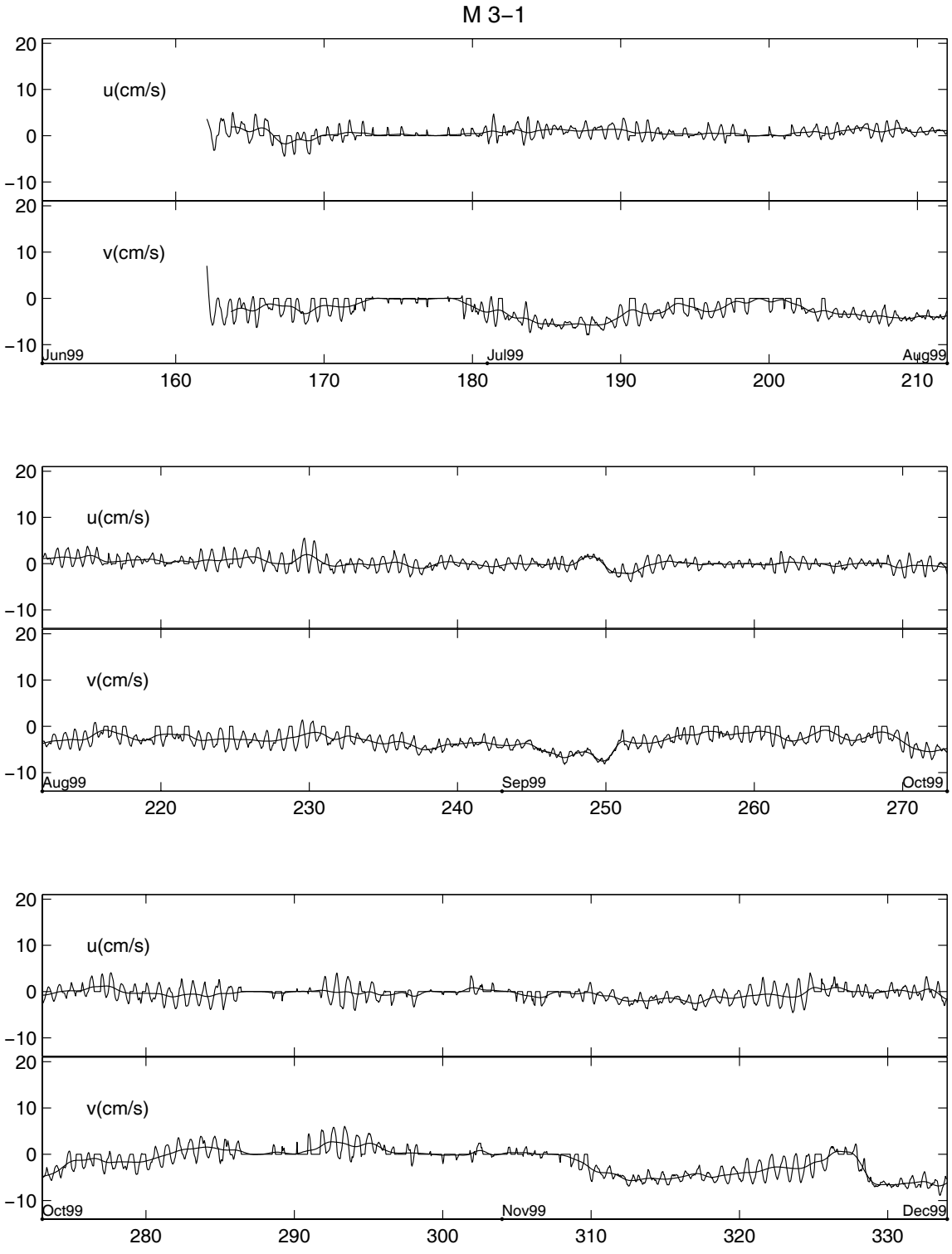

Figure 11: M3-1 Hourly and 40 HRLP Velocities

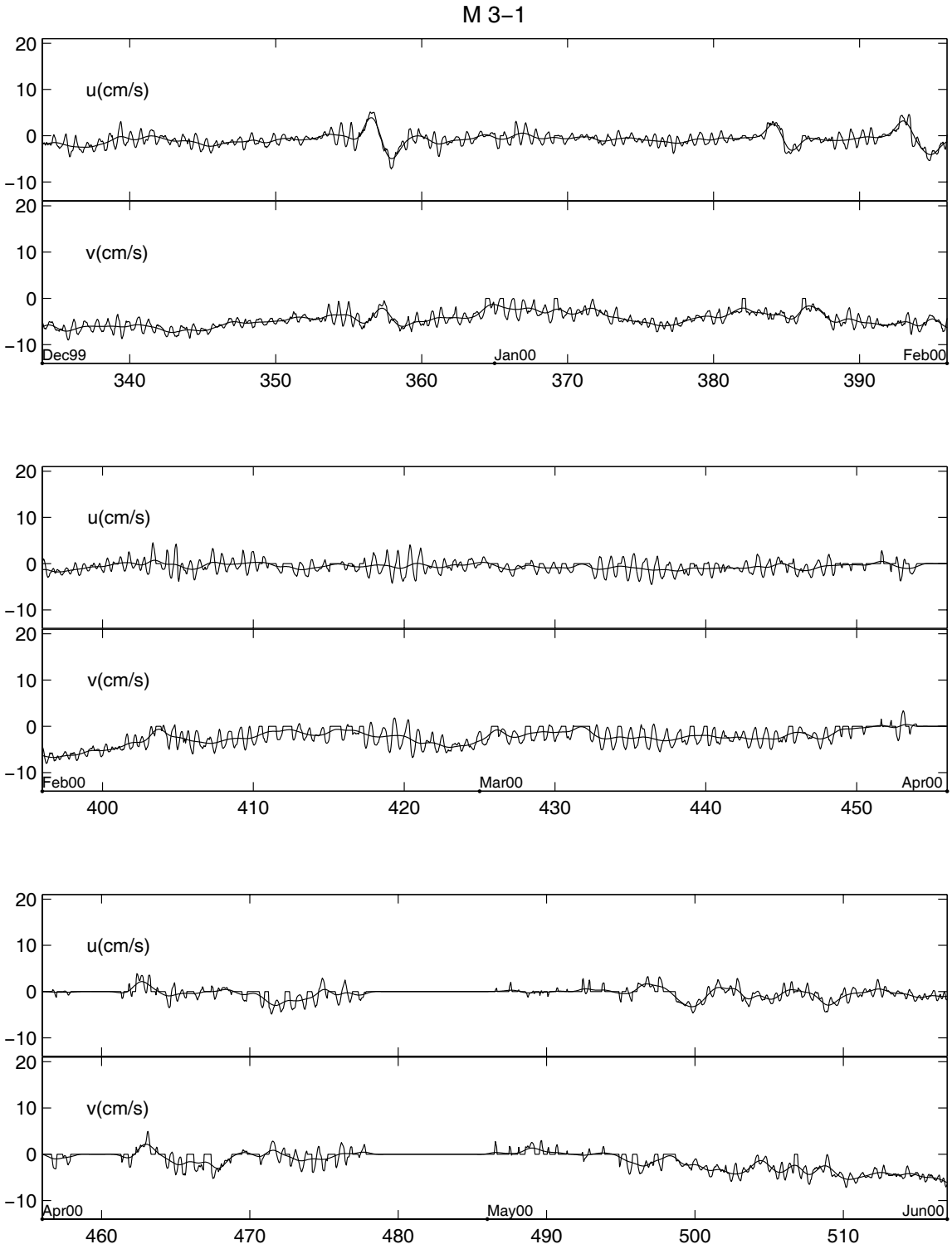

Figure 11: continued

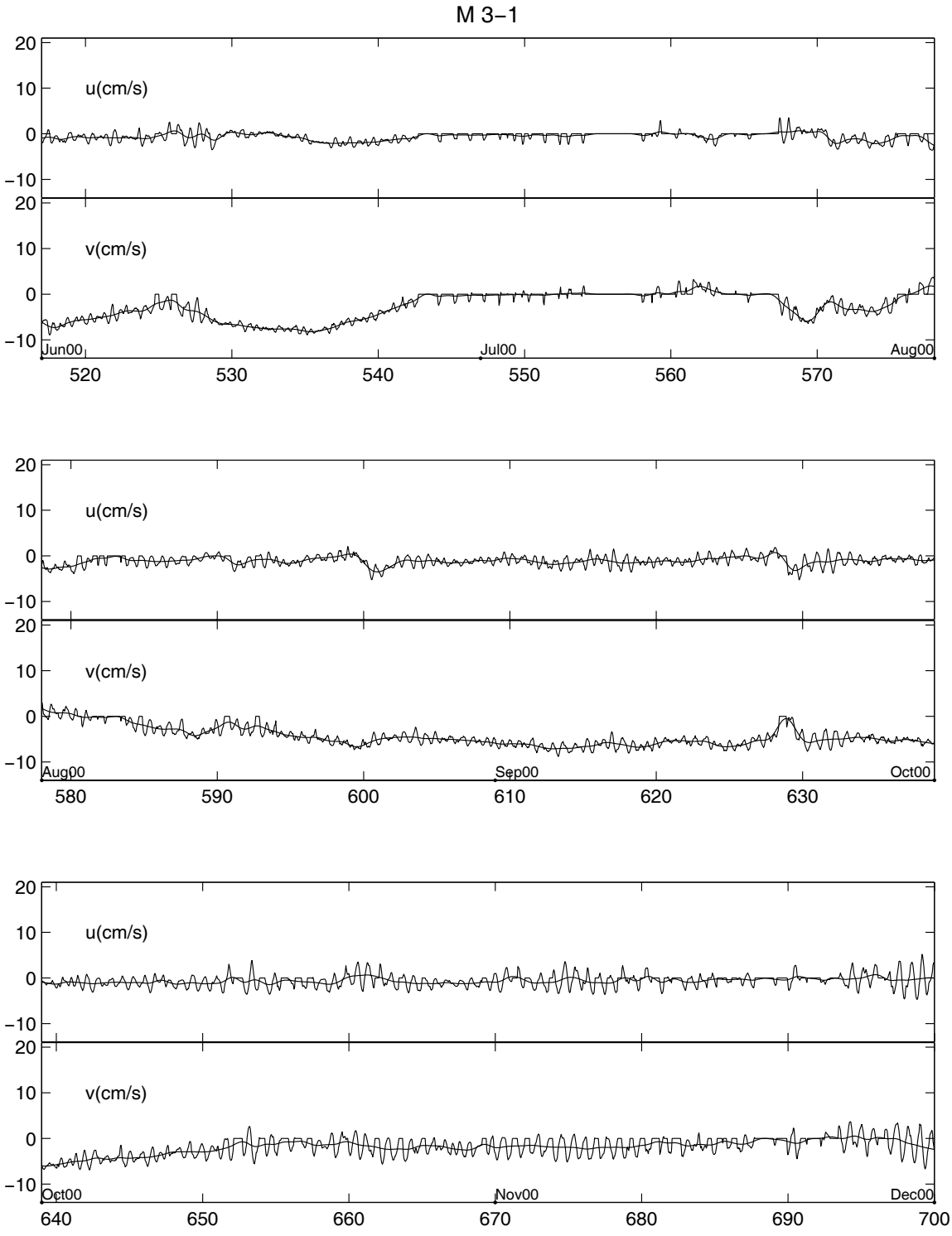

Figure 11: continued

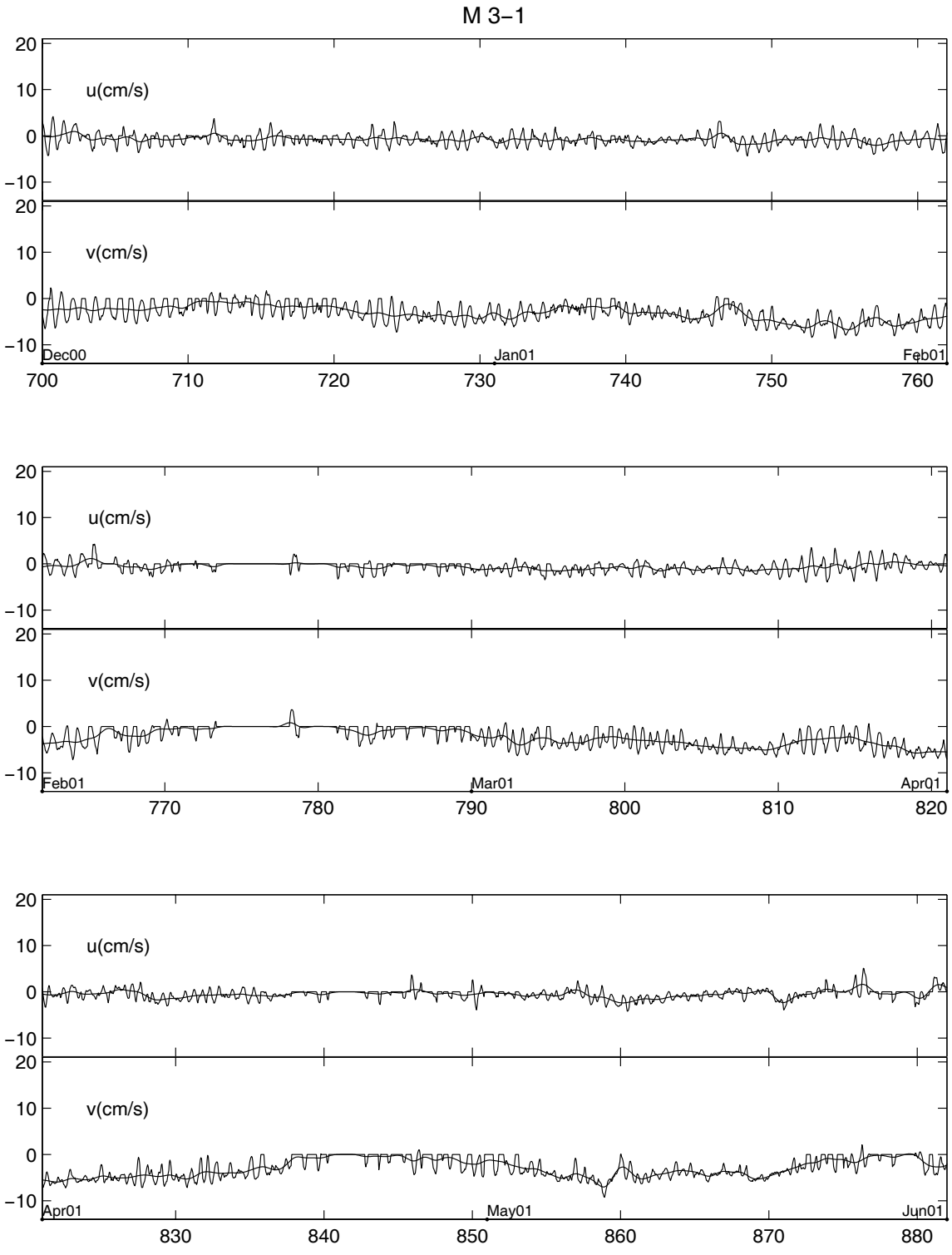

Figure 11: continued

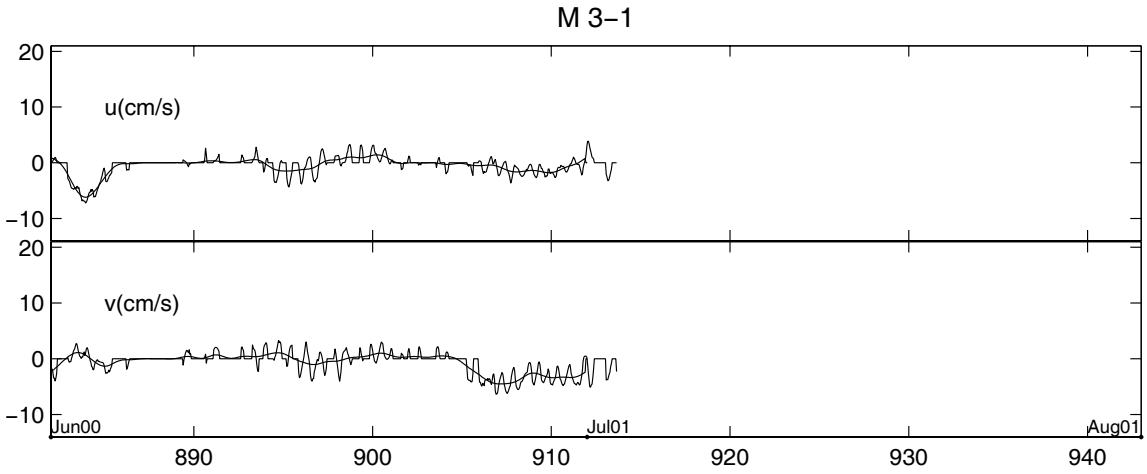

Figure 11: continued

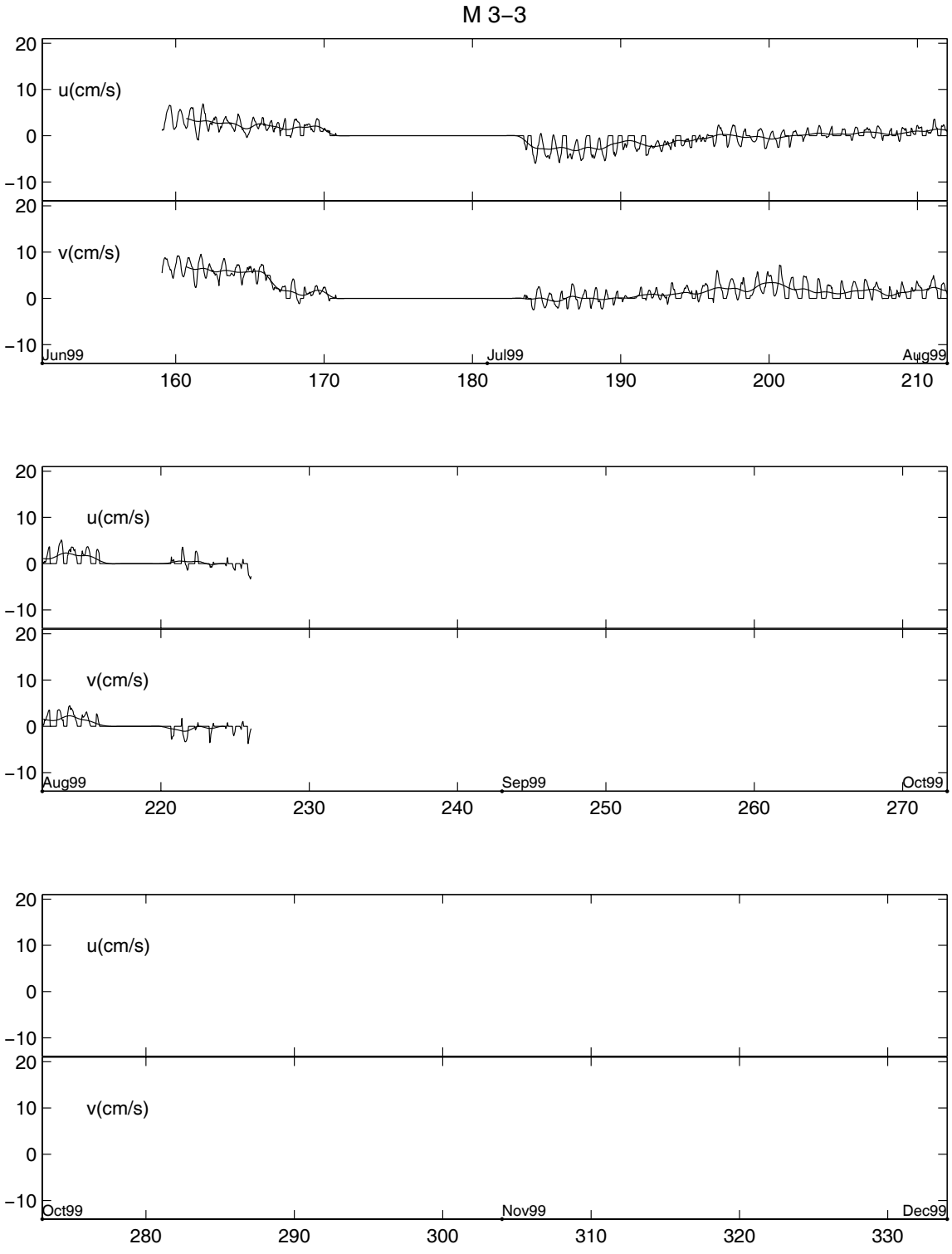

Figure 12: M3-3 Hourly and 40 HRLP Velocities

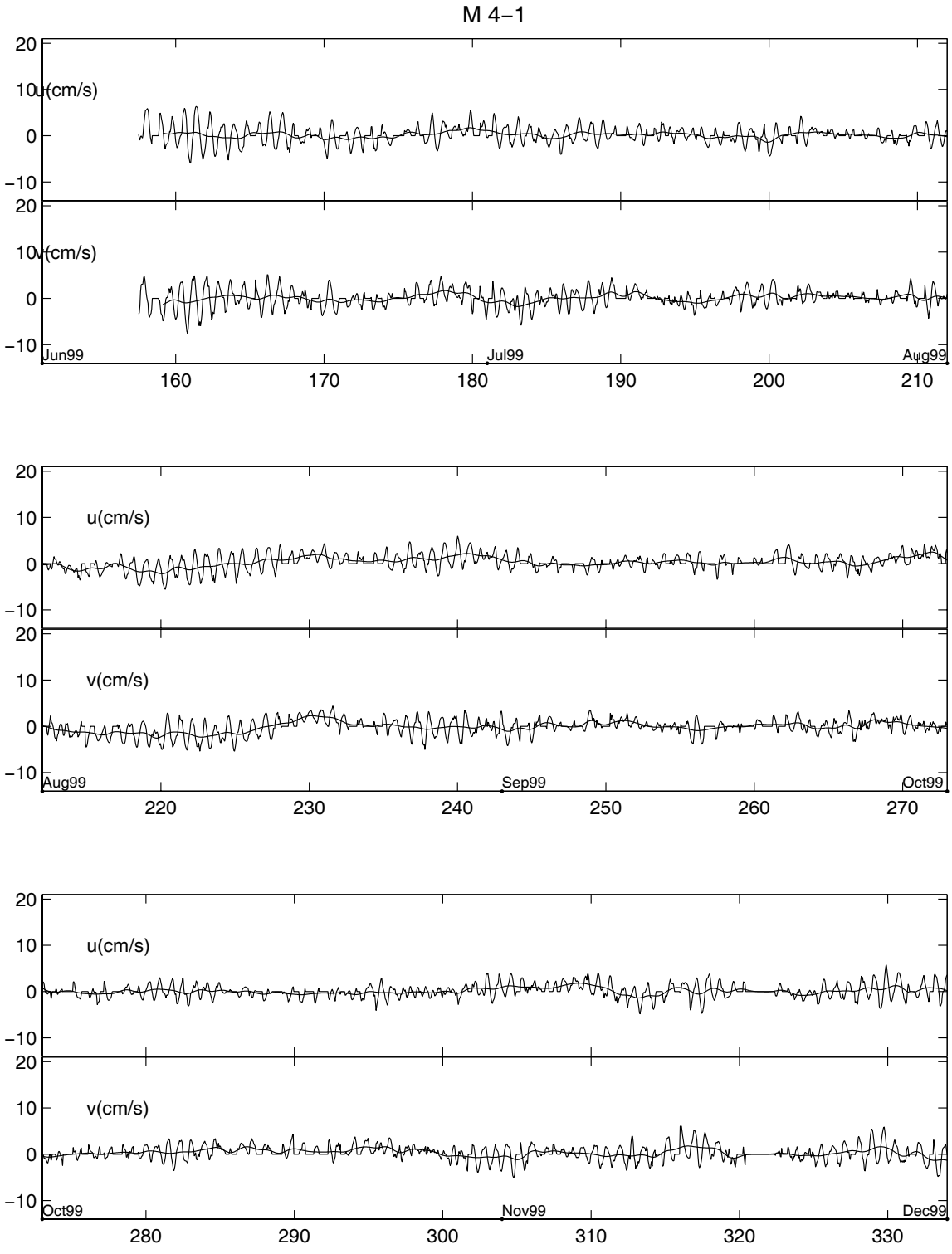

Figure 13: M4-1 Hourly and 40 HRLP Velocities

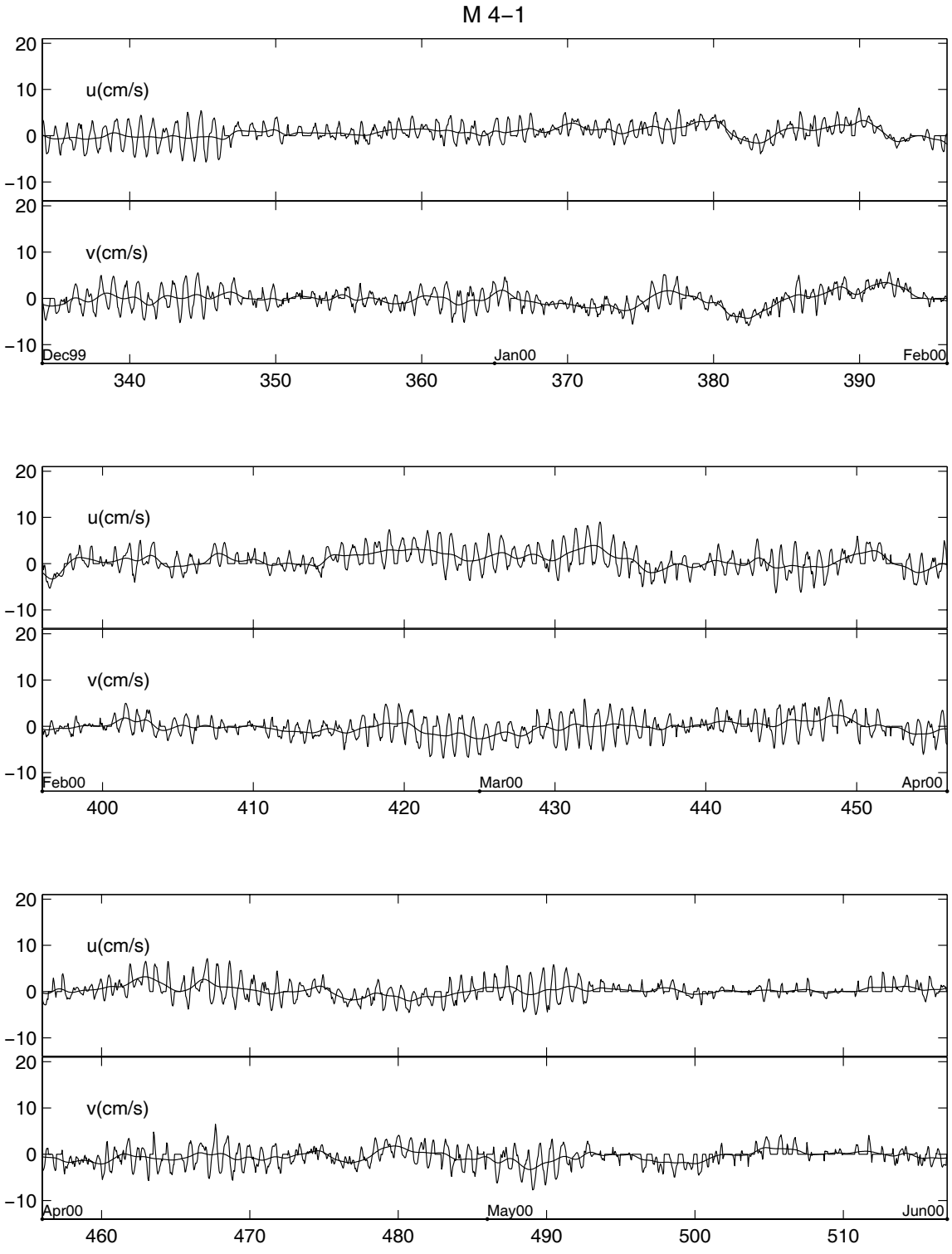

Figure 13: continued

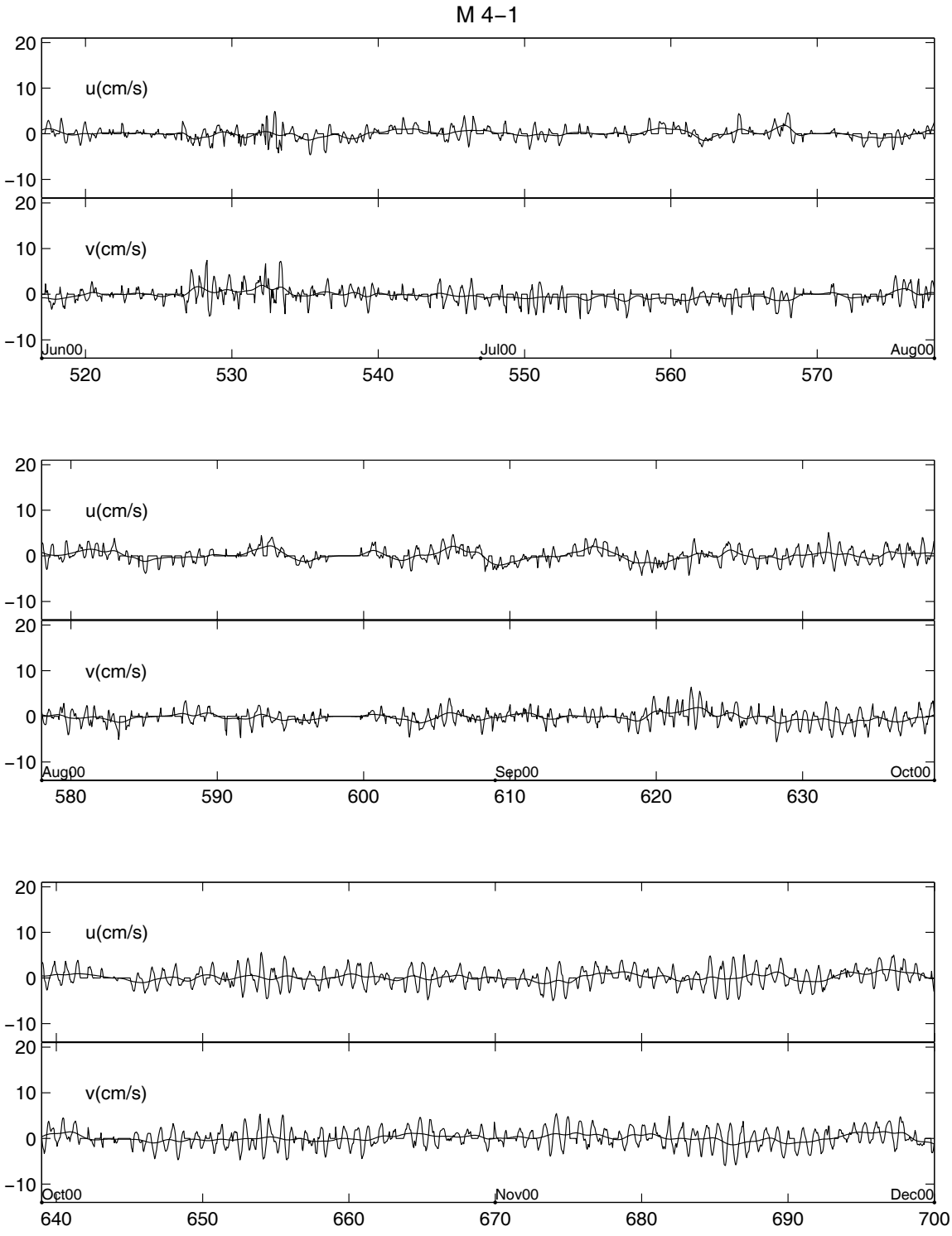

Figure 13: continued

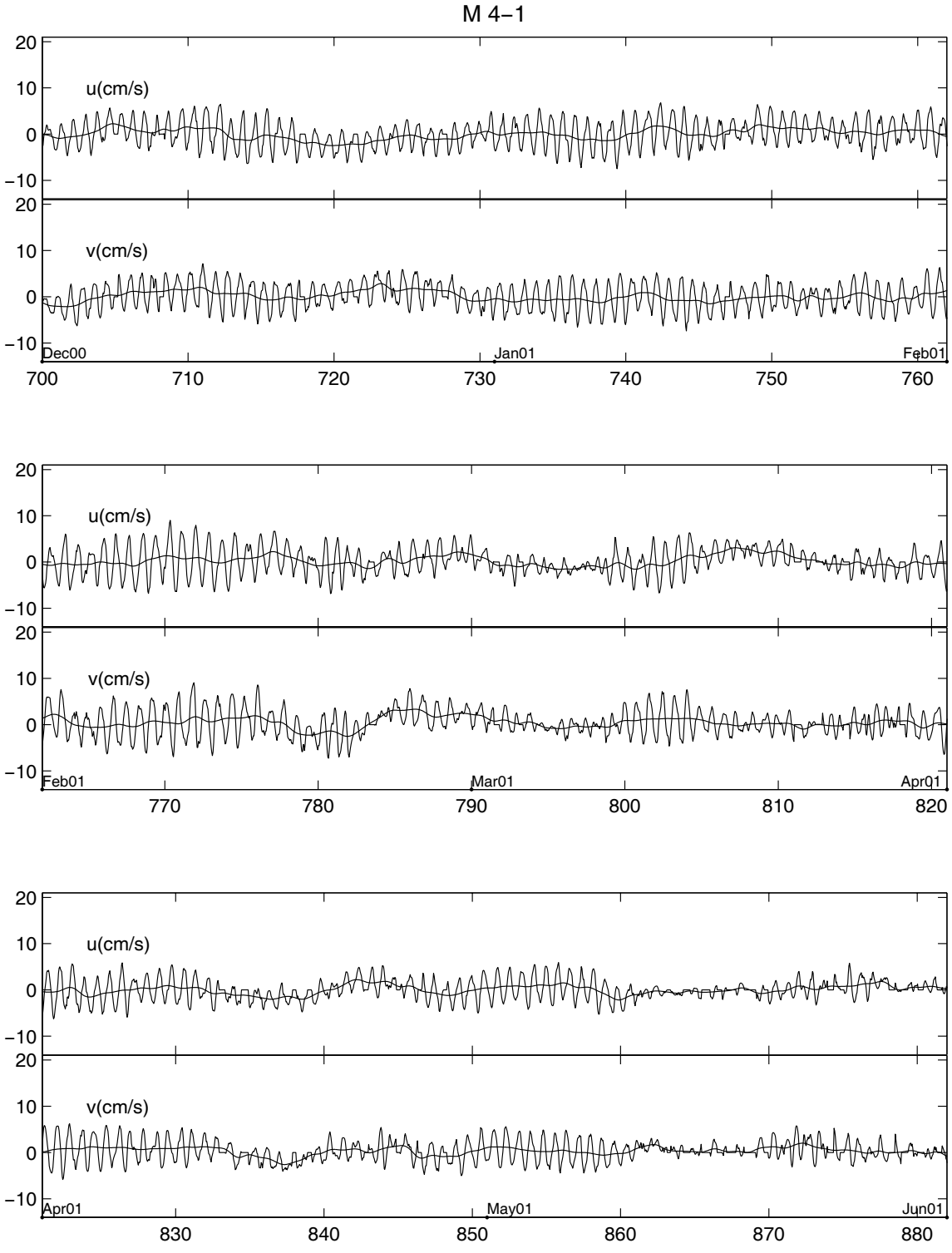

Figure 13: continued

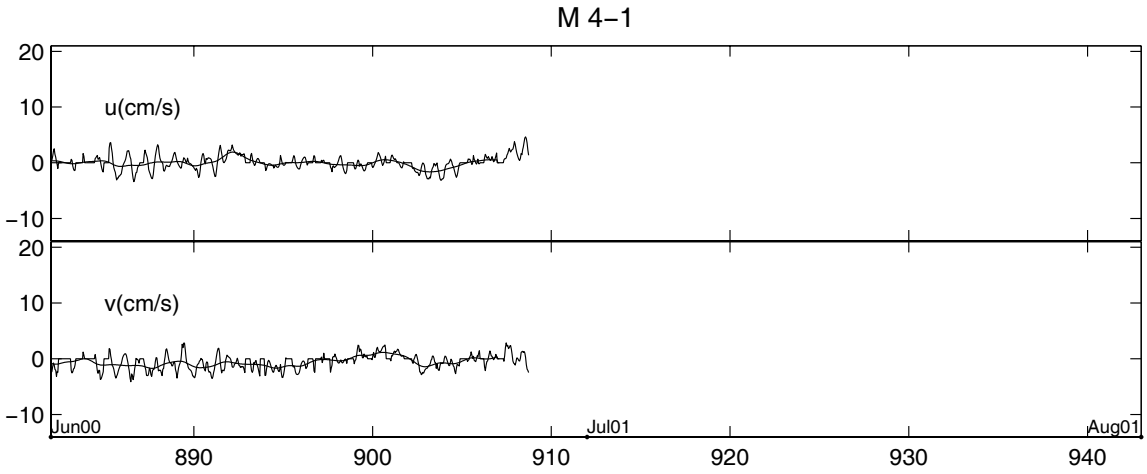

Figure 13: continued

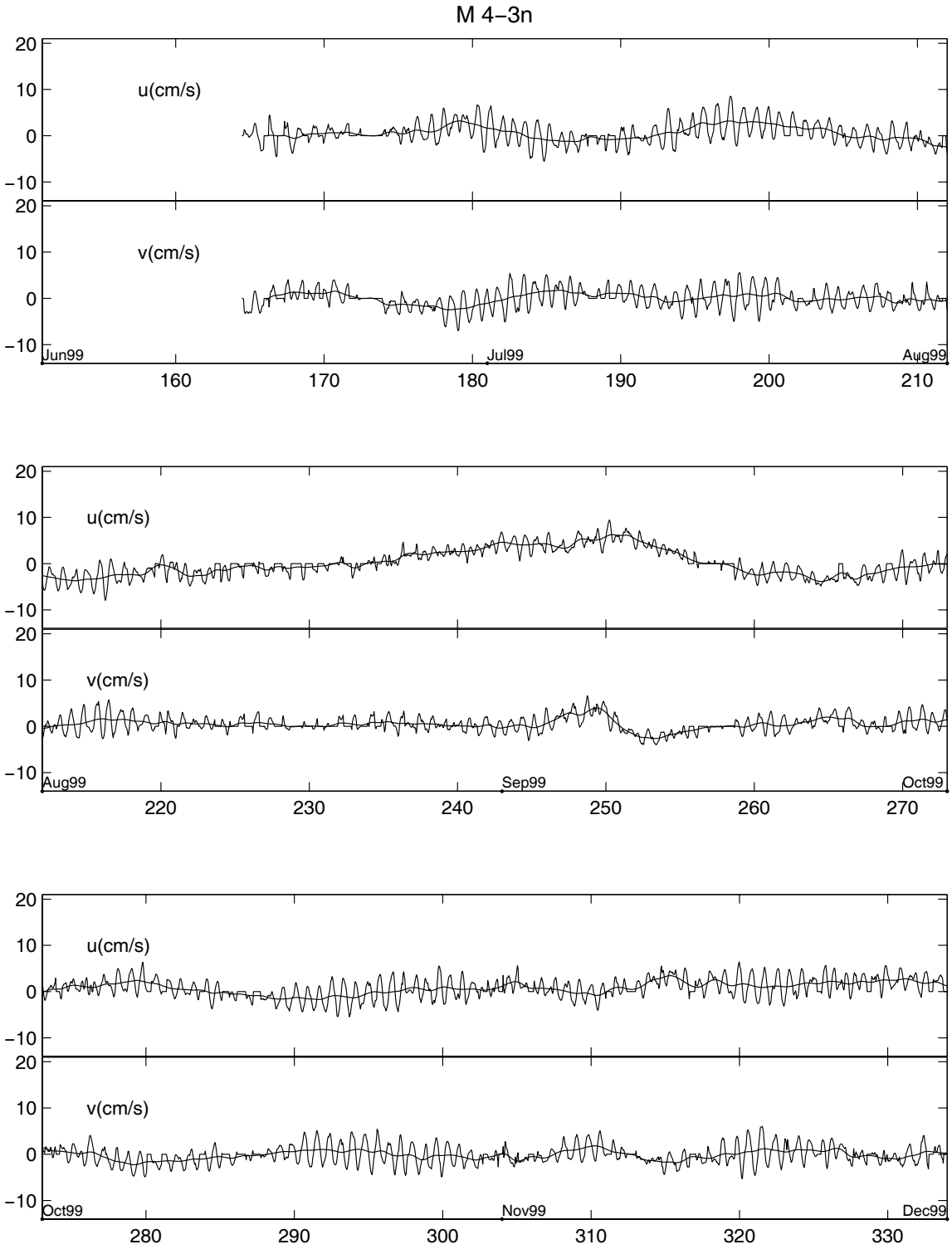

Figure 14: M4-3n Hourly and 40 HRLP Velocities

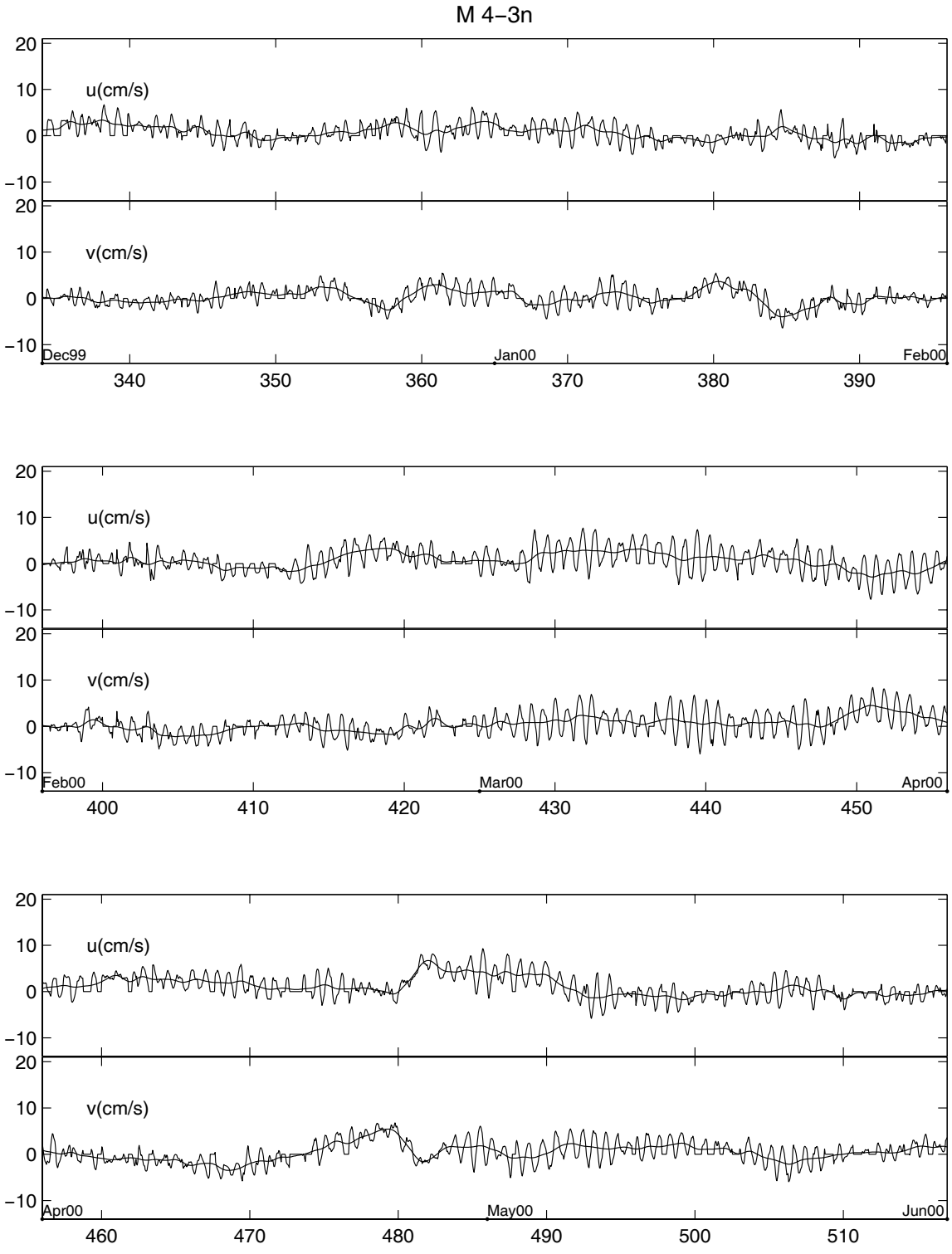

Figure 14: continued

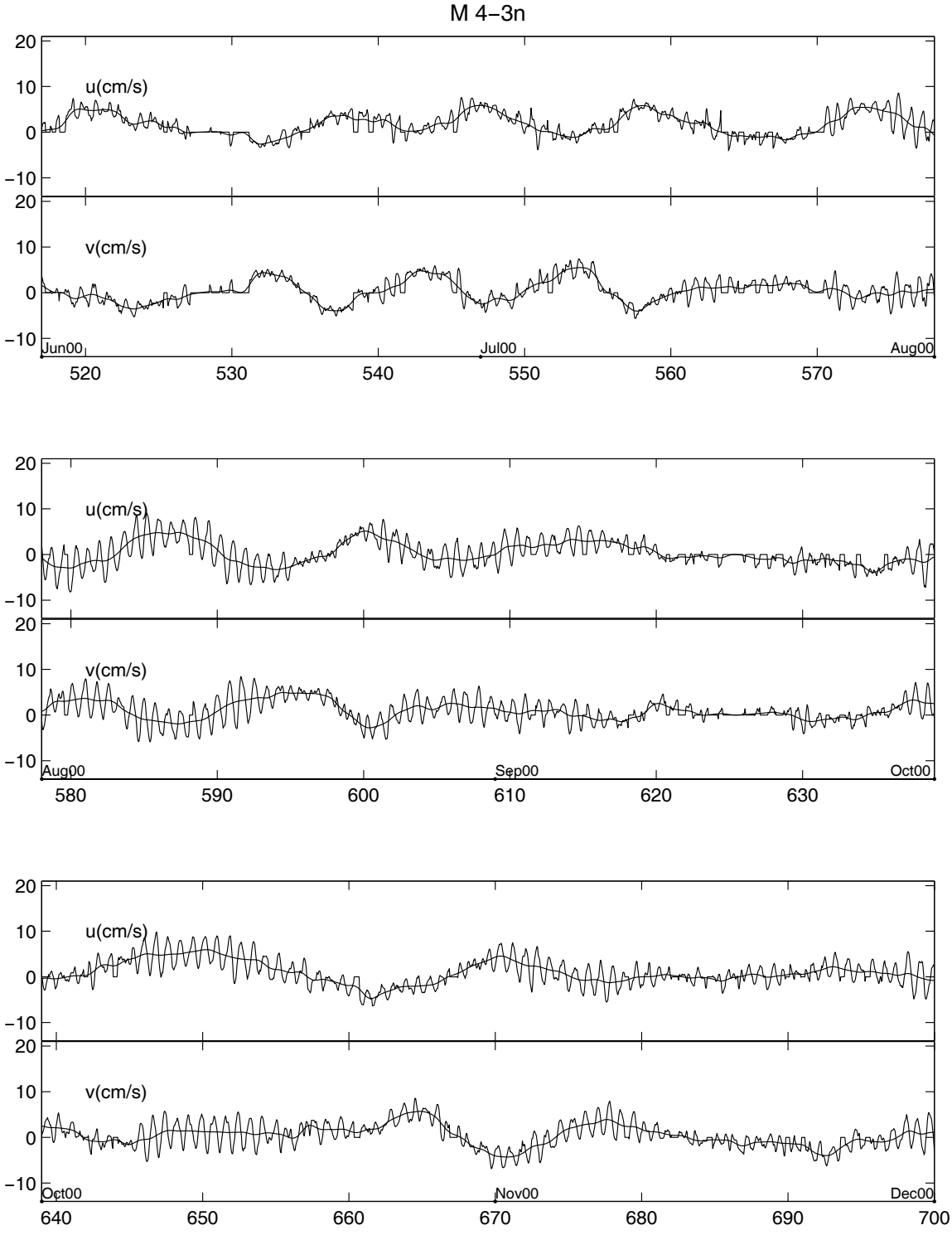

Figure 14: continued

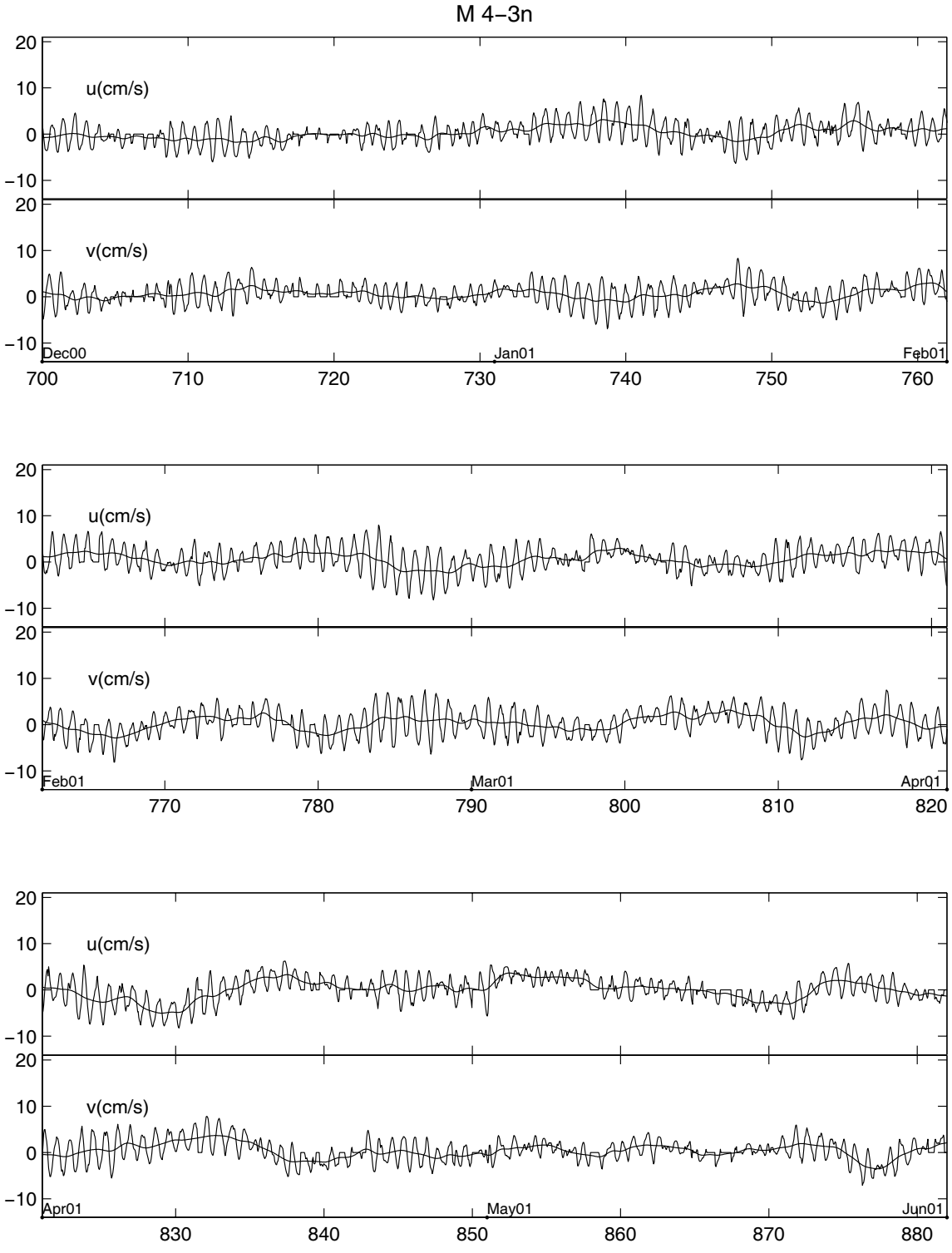

Figure 14: continued

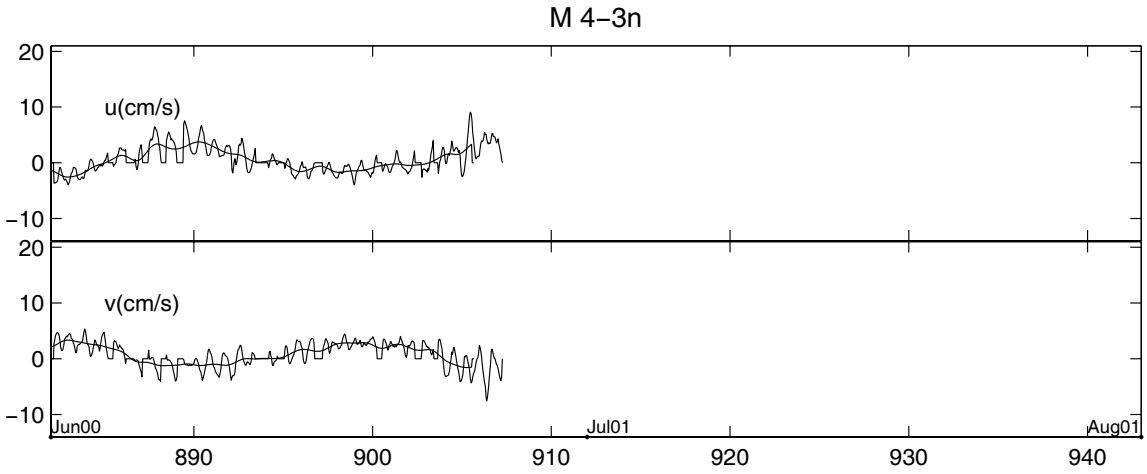

Figure 14: continued

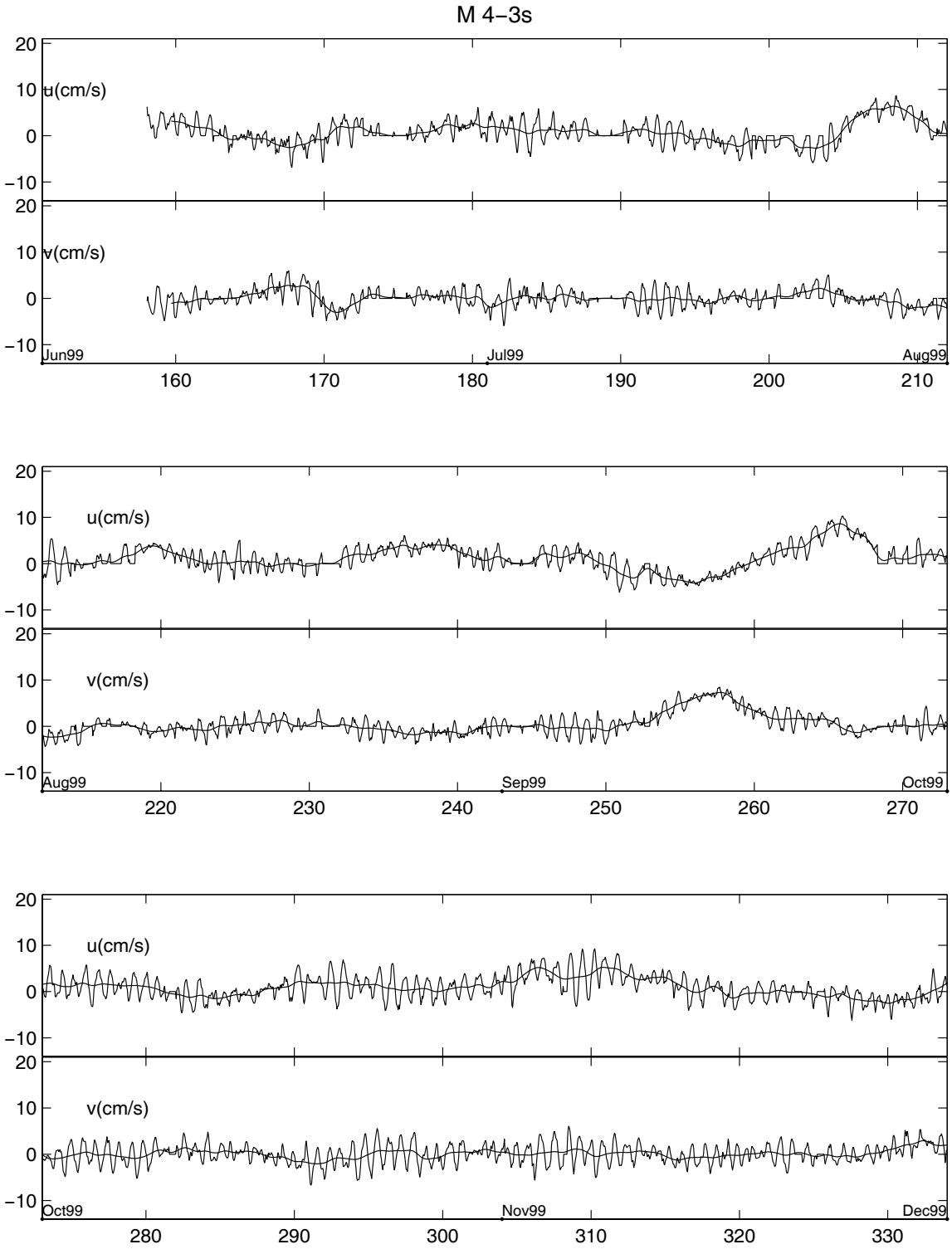

Figure 15: M 4-3s Hourly and 40 HRLP Velocities

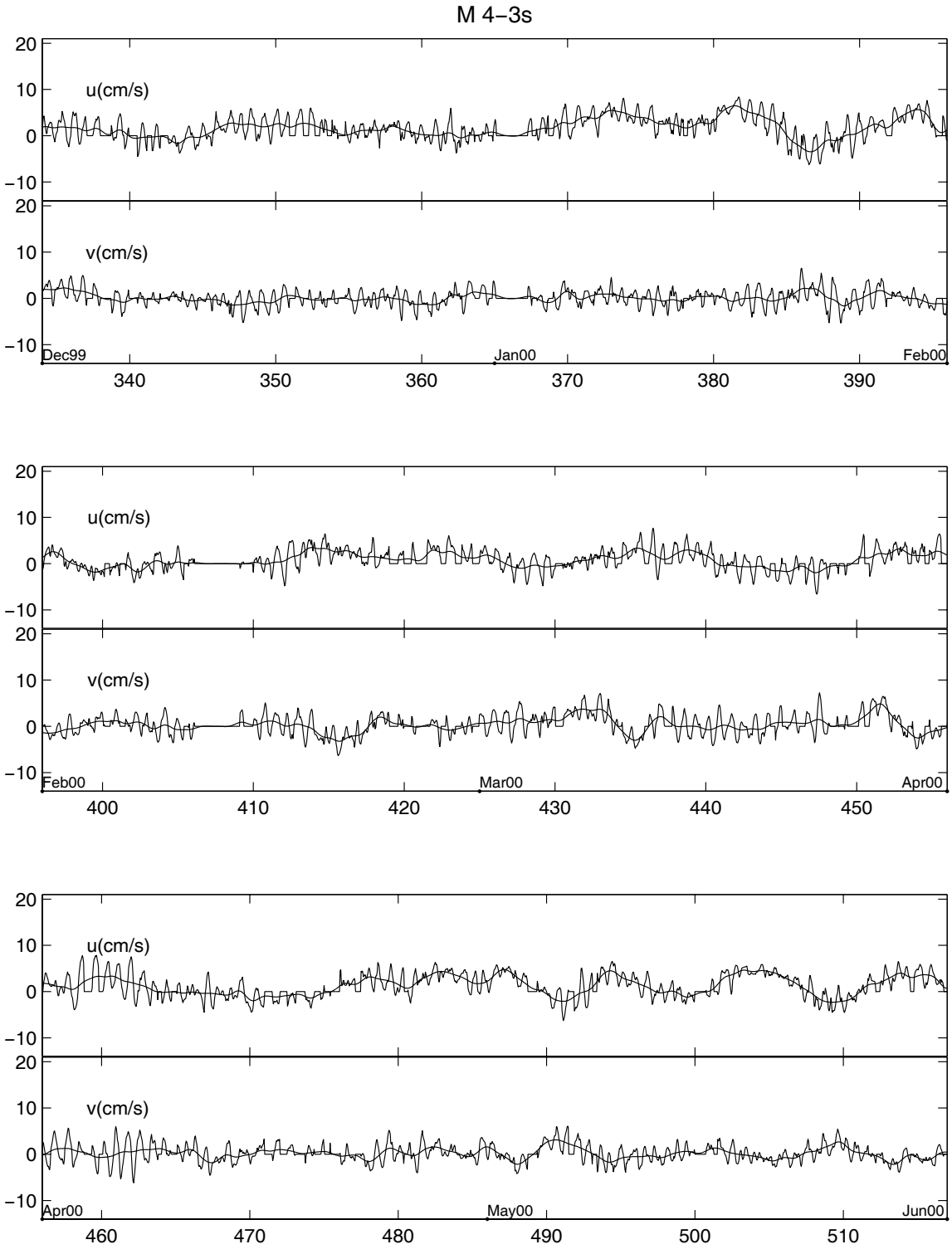

Figure 15: continued

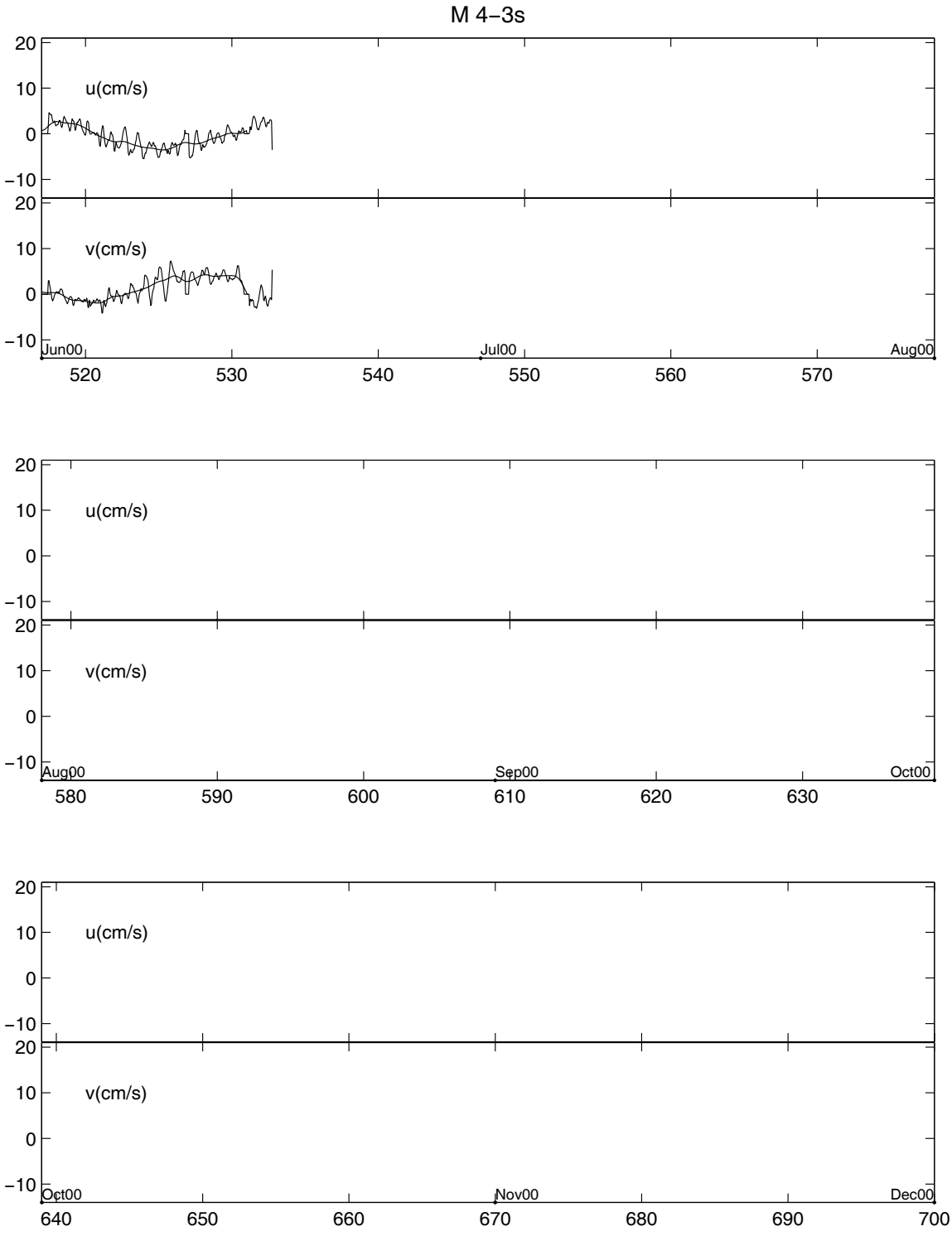

Figure 15: continued

6 120 HRLP Time Series

Figures 16–26 display the 120 HRLP time series for each instrument in 8-month data frames. A common time scale is used. On the time axis, both date and decimal day are indicated. The velocity scale is from -14 cm s^{-1} to 21 cm s^{-1} in all frames.

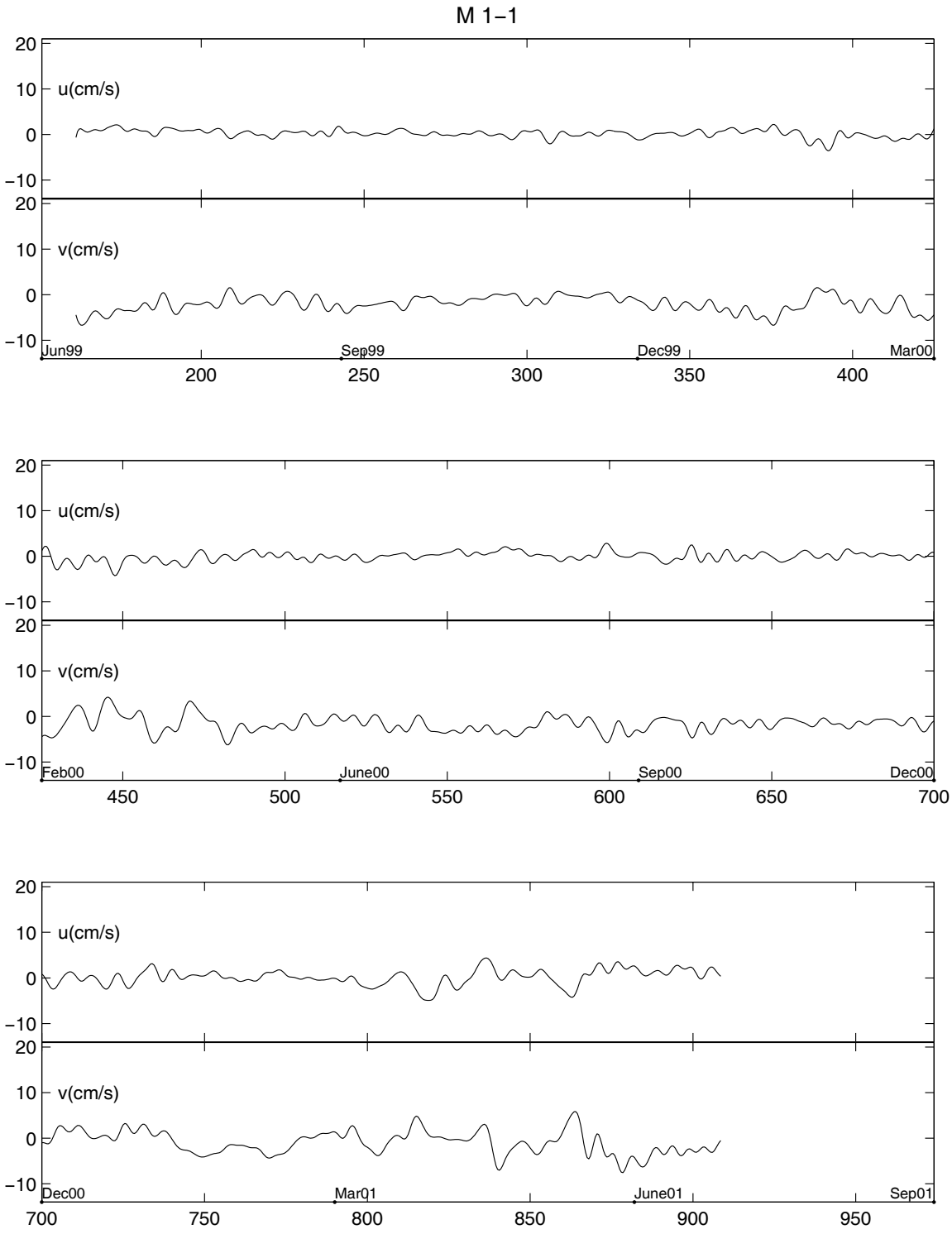

Figure 16: M1-1 120 HRLP Velocities

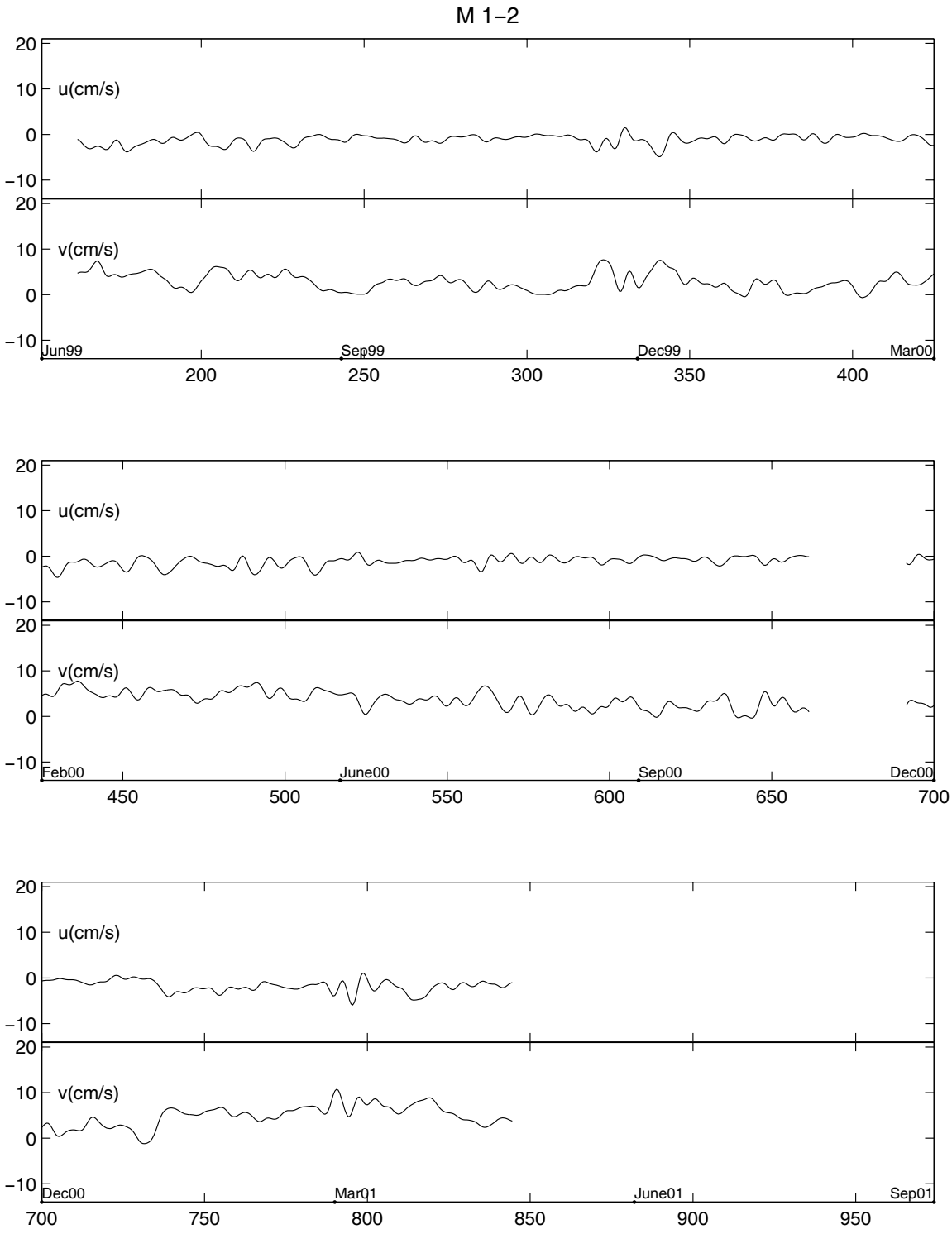

Figure 17: M1-12 120 HRLP Velocities

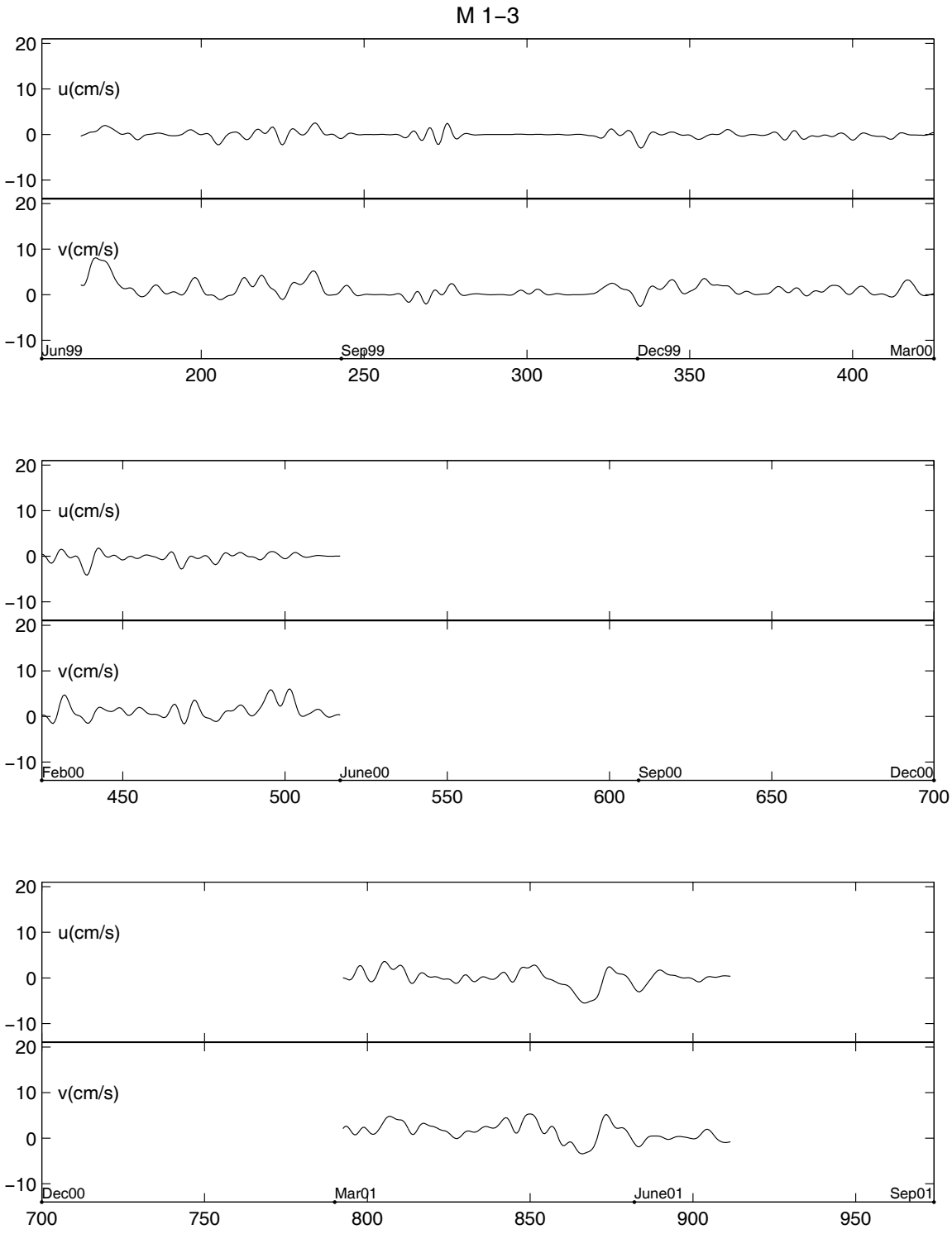

Figure 18: M1-3 120 HRLP Velocities

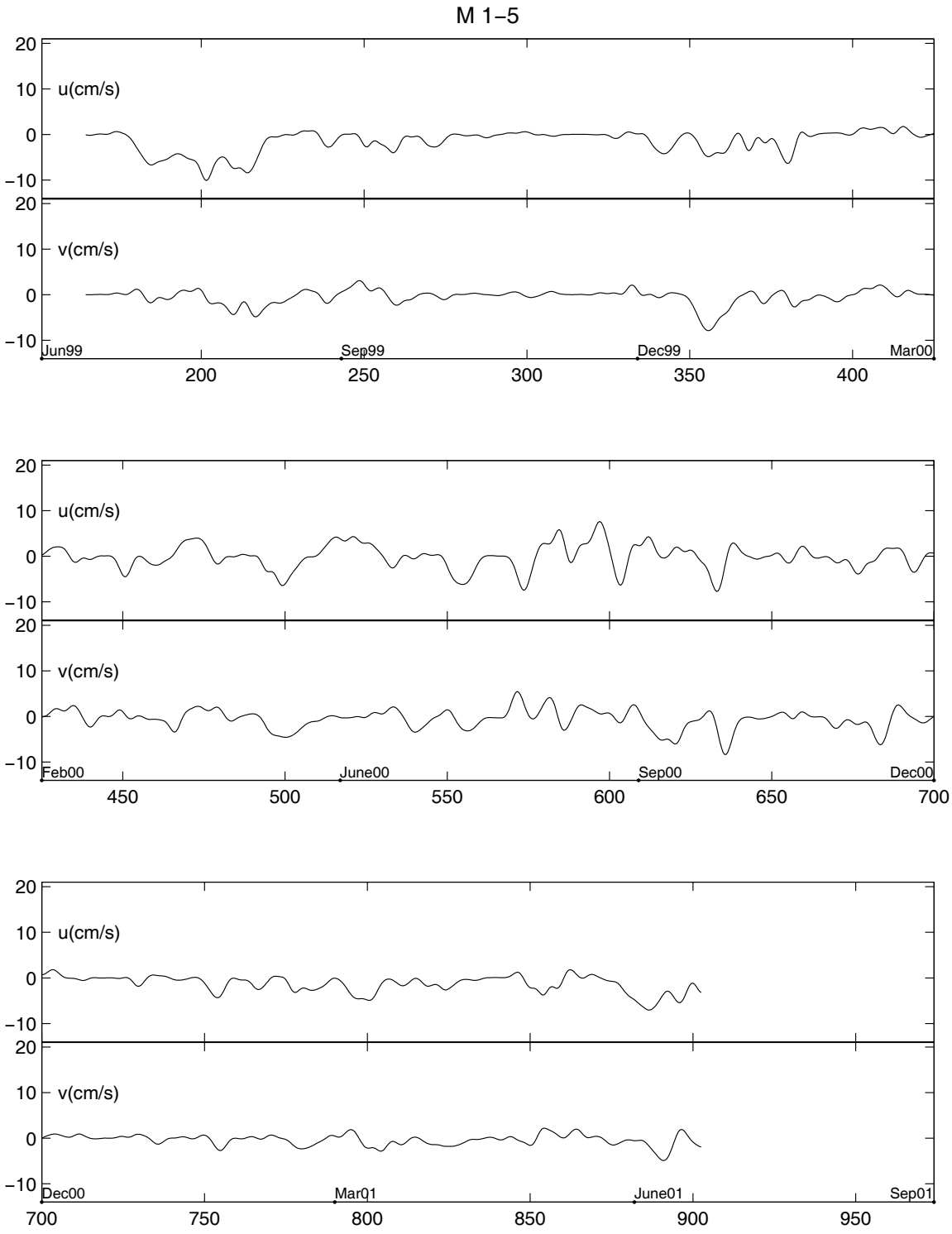

Figure 19: M1-5 120 HRLP Velocities

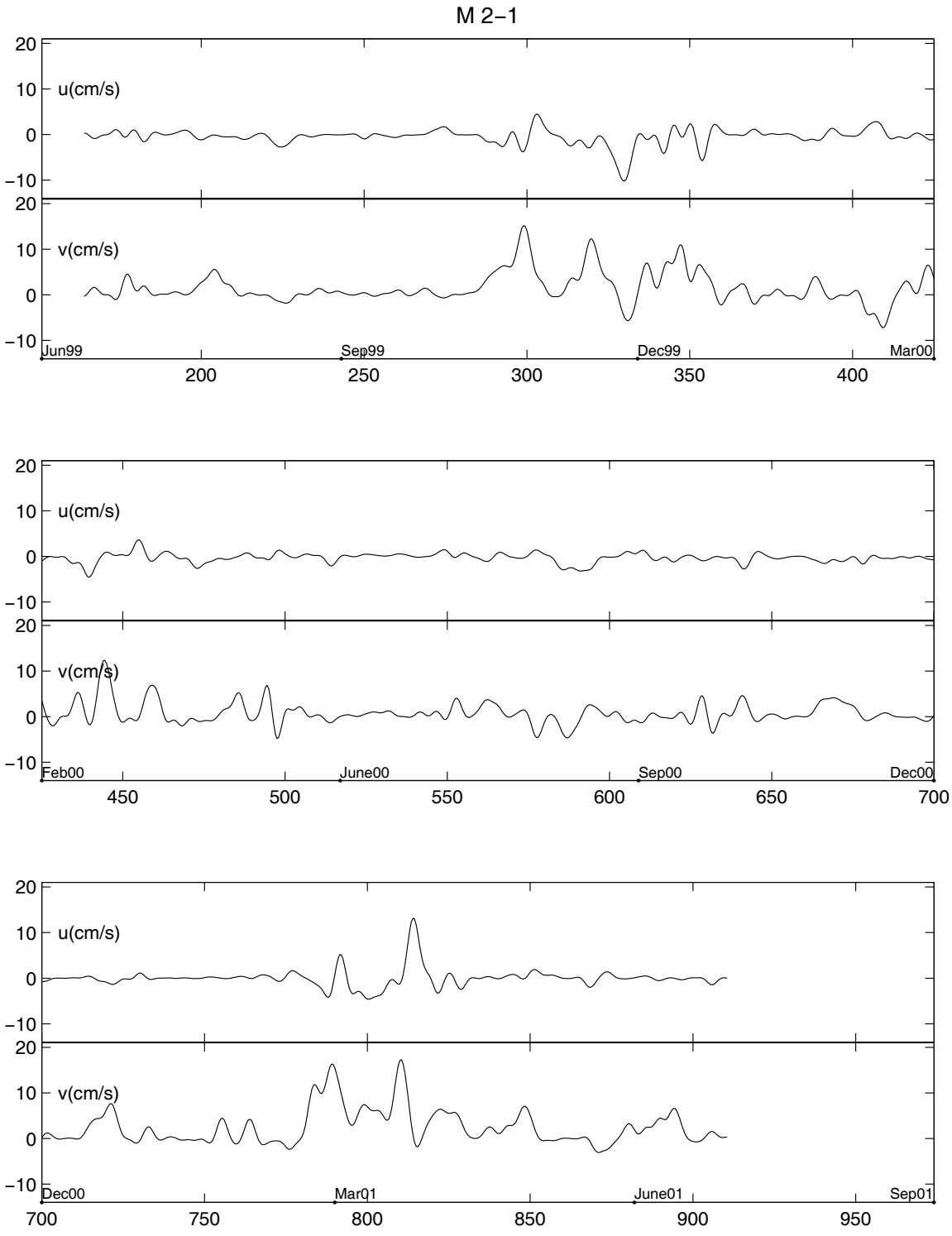

Figure 20: M2-1 120 HRLP Velocities

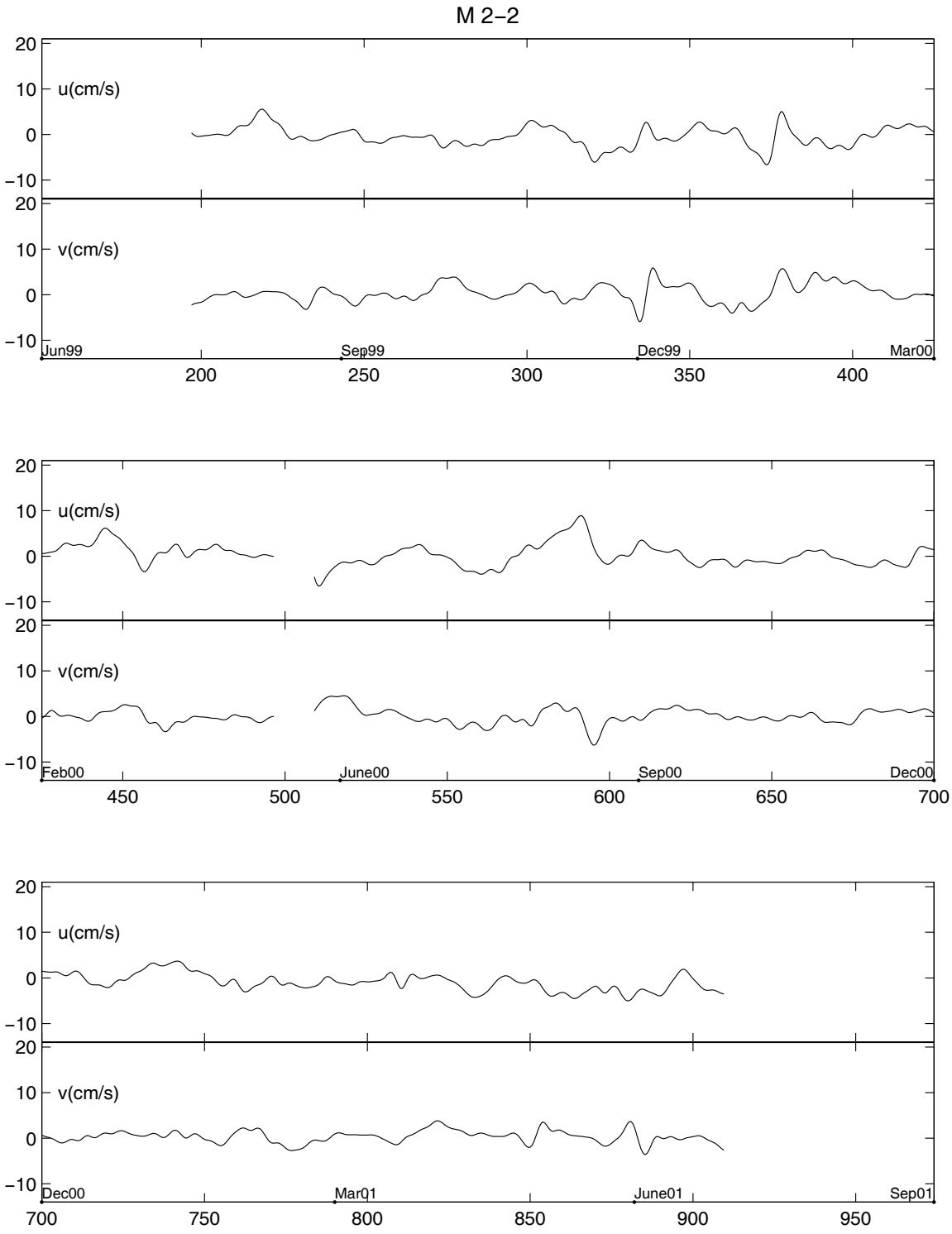

Figure 21: M2-2 120 HRLP Velocities

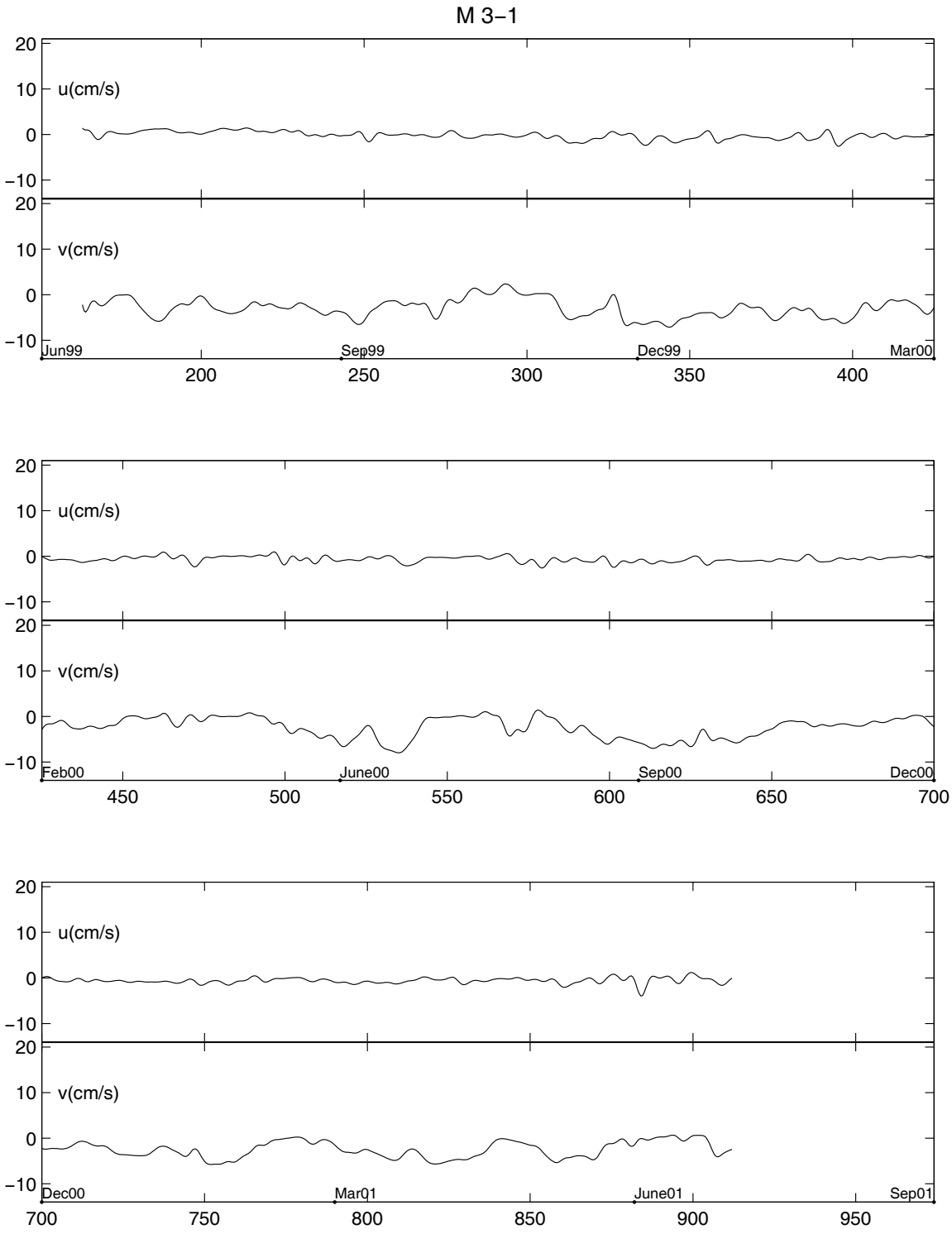

Figure 22: M3-1 120 HRLP Velocities

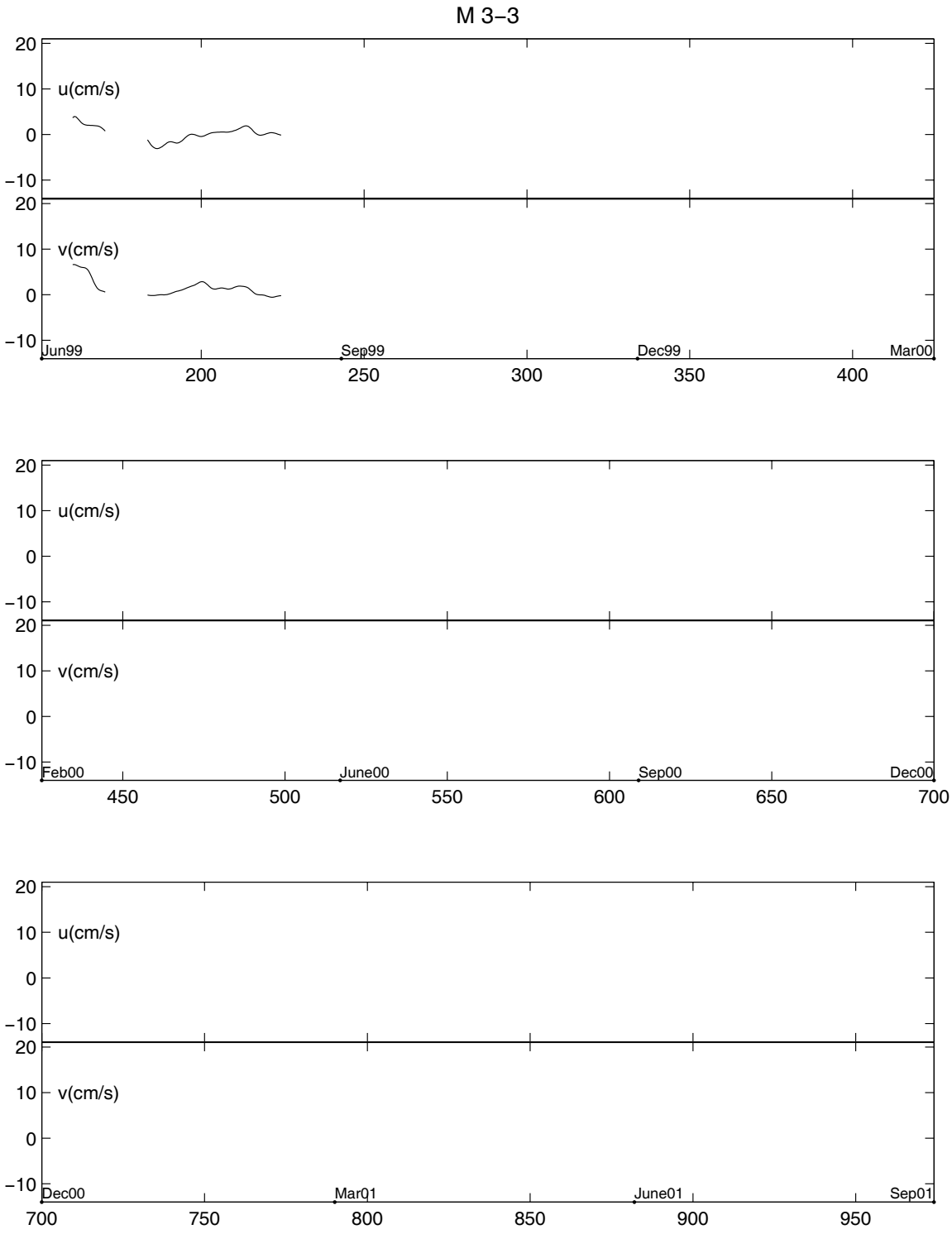

Figure 23: M3-3 120 HRLP Velocities

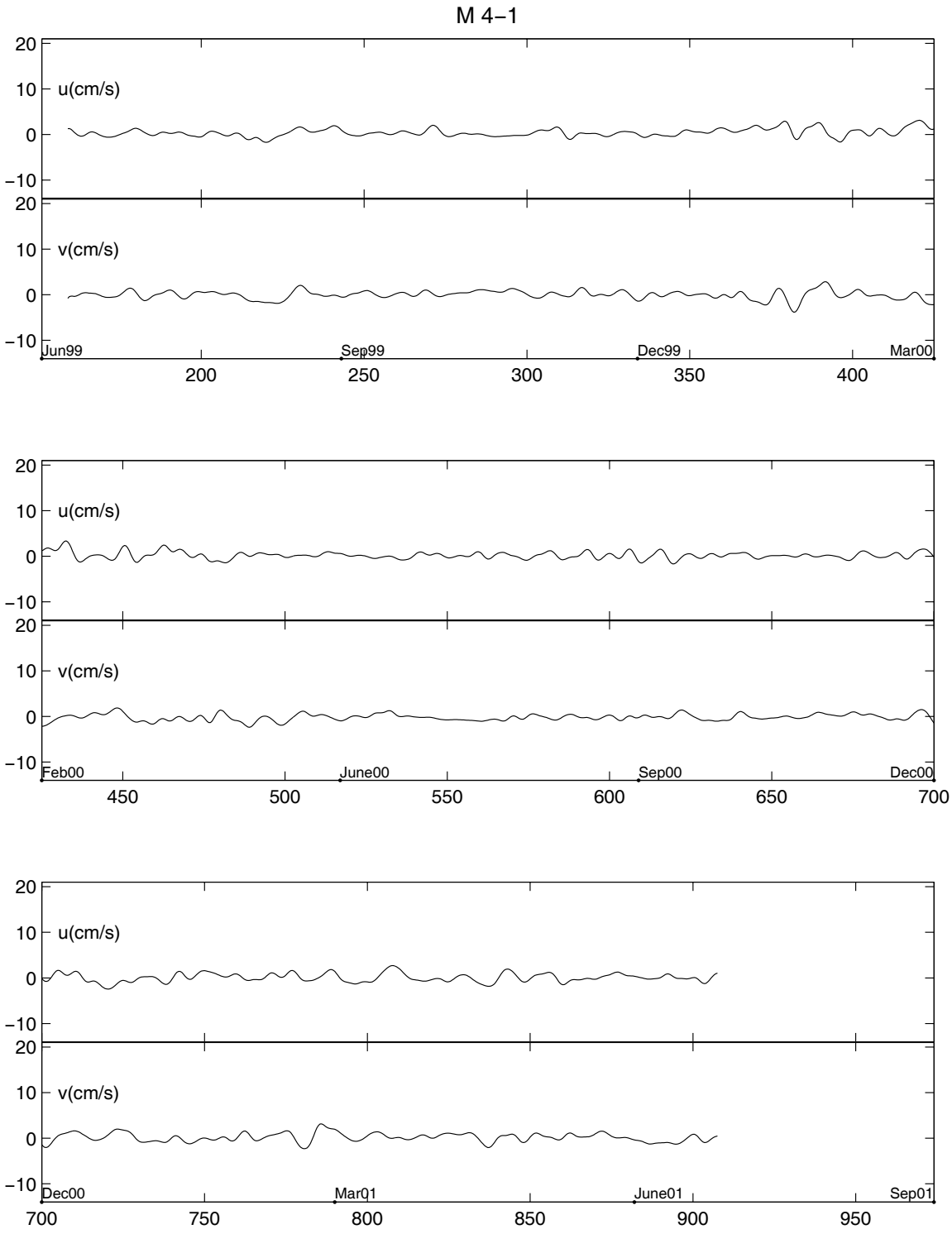

Figure 24: M4-1 120 HRLP Velocities

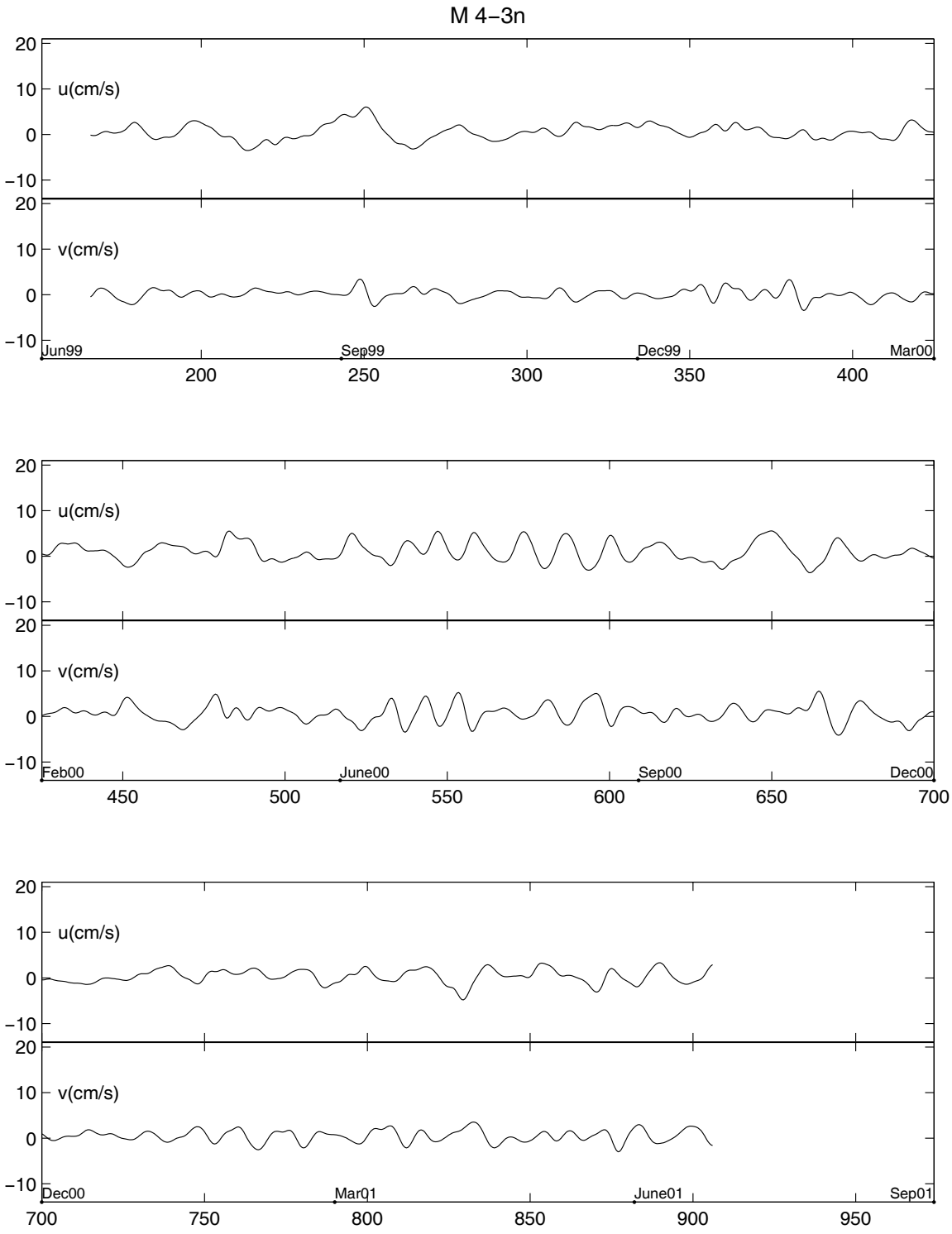

Figure 25: M4-3n 120 HRLP Velocities

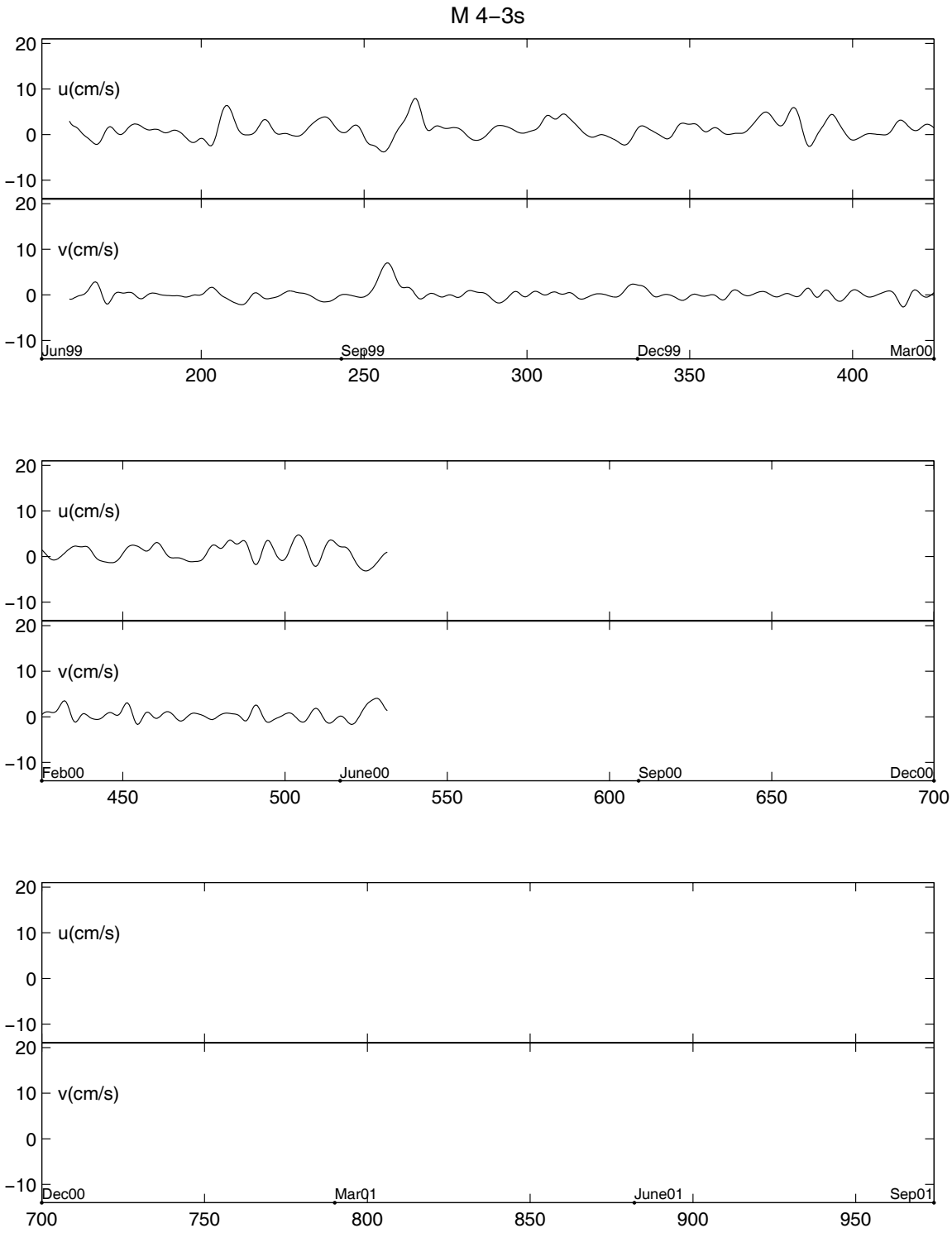

Figure 26: M4-3s 120 HRLP Velocities

7 Hourly Temperature Data Time Series

Figures 27–37 display the hourly temperature data for each instrument in 8-month data frames. A common time scale is used. On the time axis, both date and decimal day are indicated. The temperature scale is from 0.1^0C to 0.3^0C in all frames.

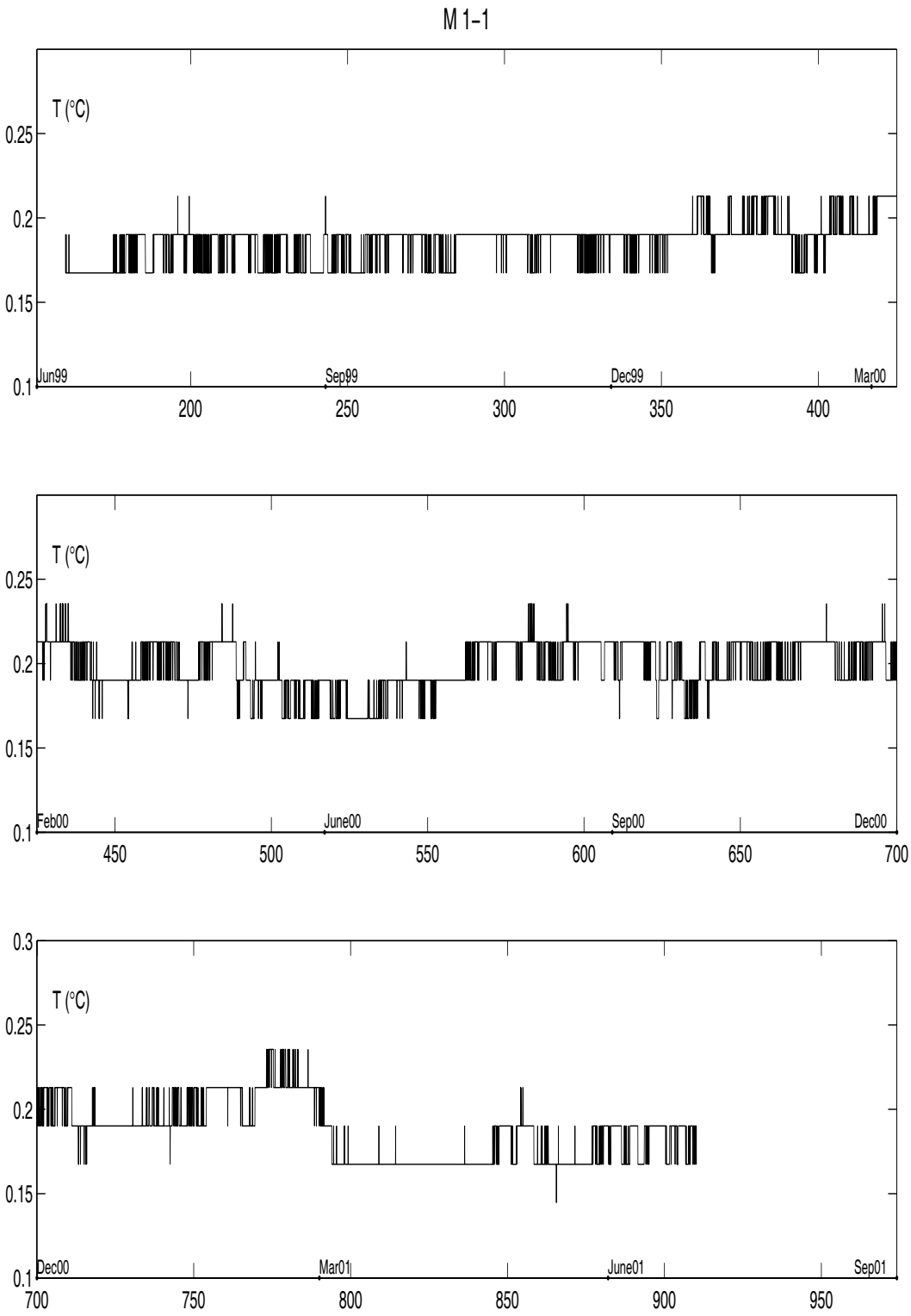

Figure 27: M1-1 Hourly Temperature

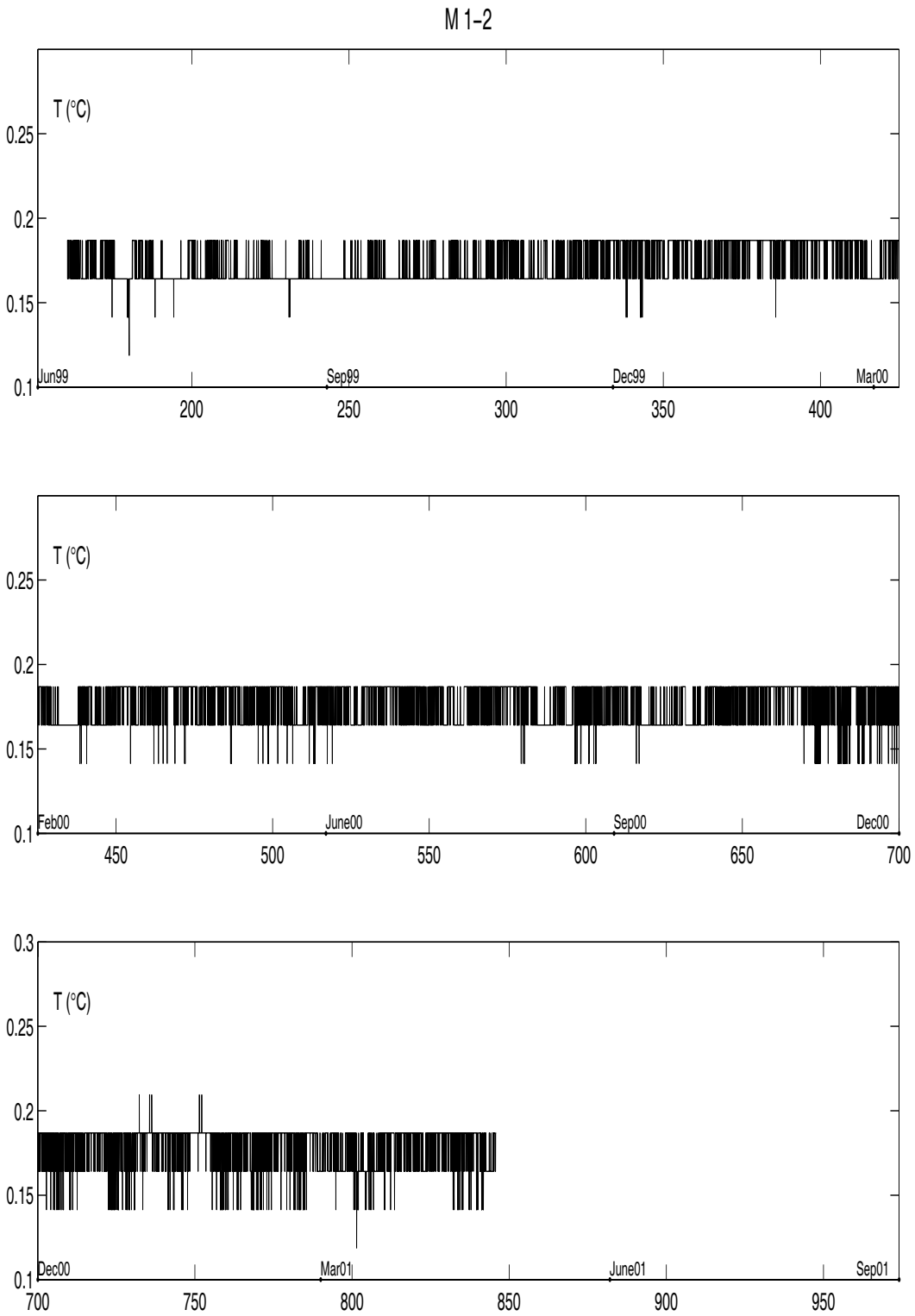

Figure 28: M1-2 Hourly Temperature

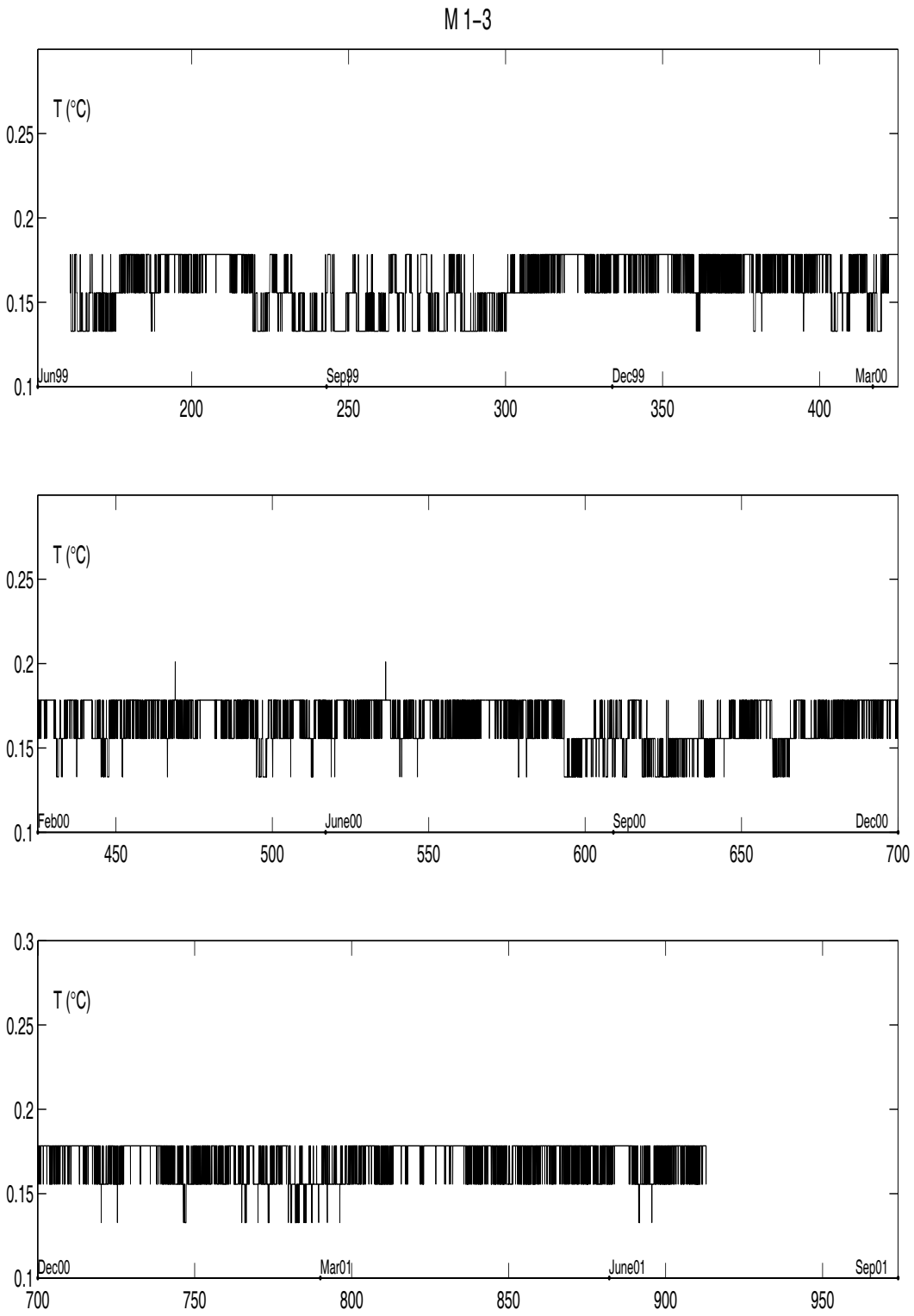

Figure 29: M1-3 Hourly Temperature

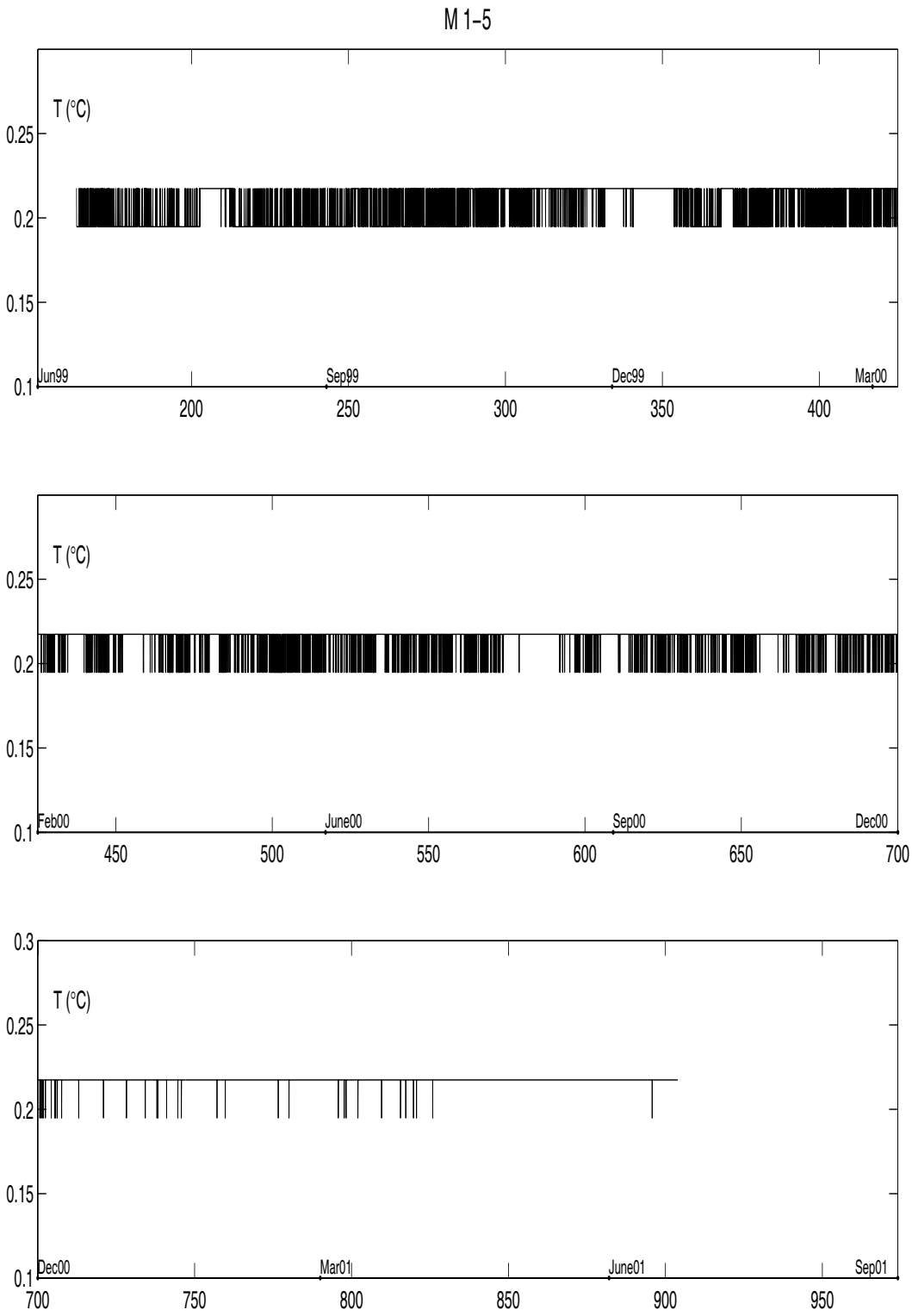

Figure 30: M1-5 Hourly Temperature

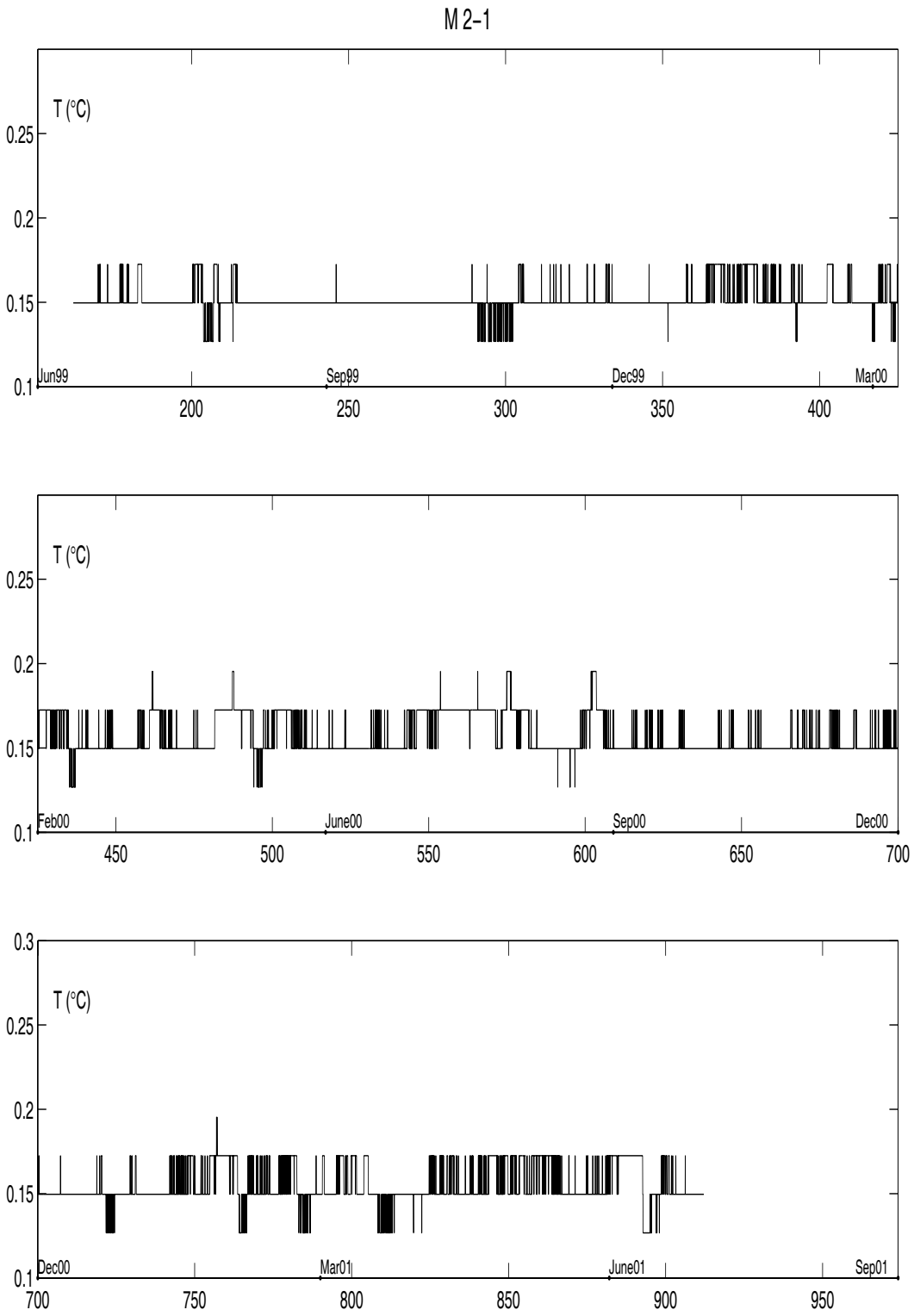

Figure 31: M2-1 Hourly Temperature

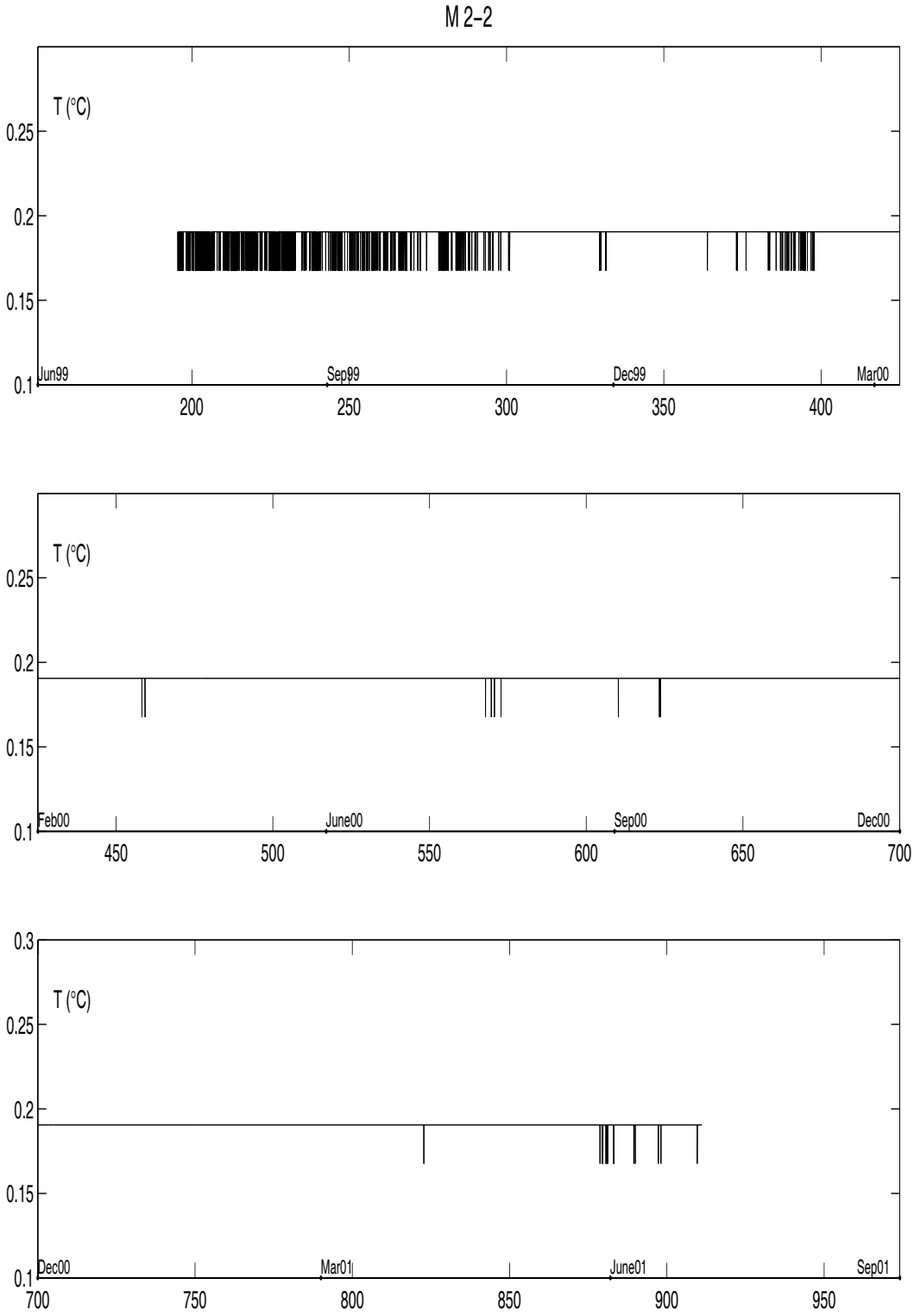

Figure 32: M2-2 Hourly Temperature

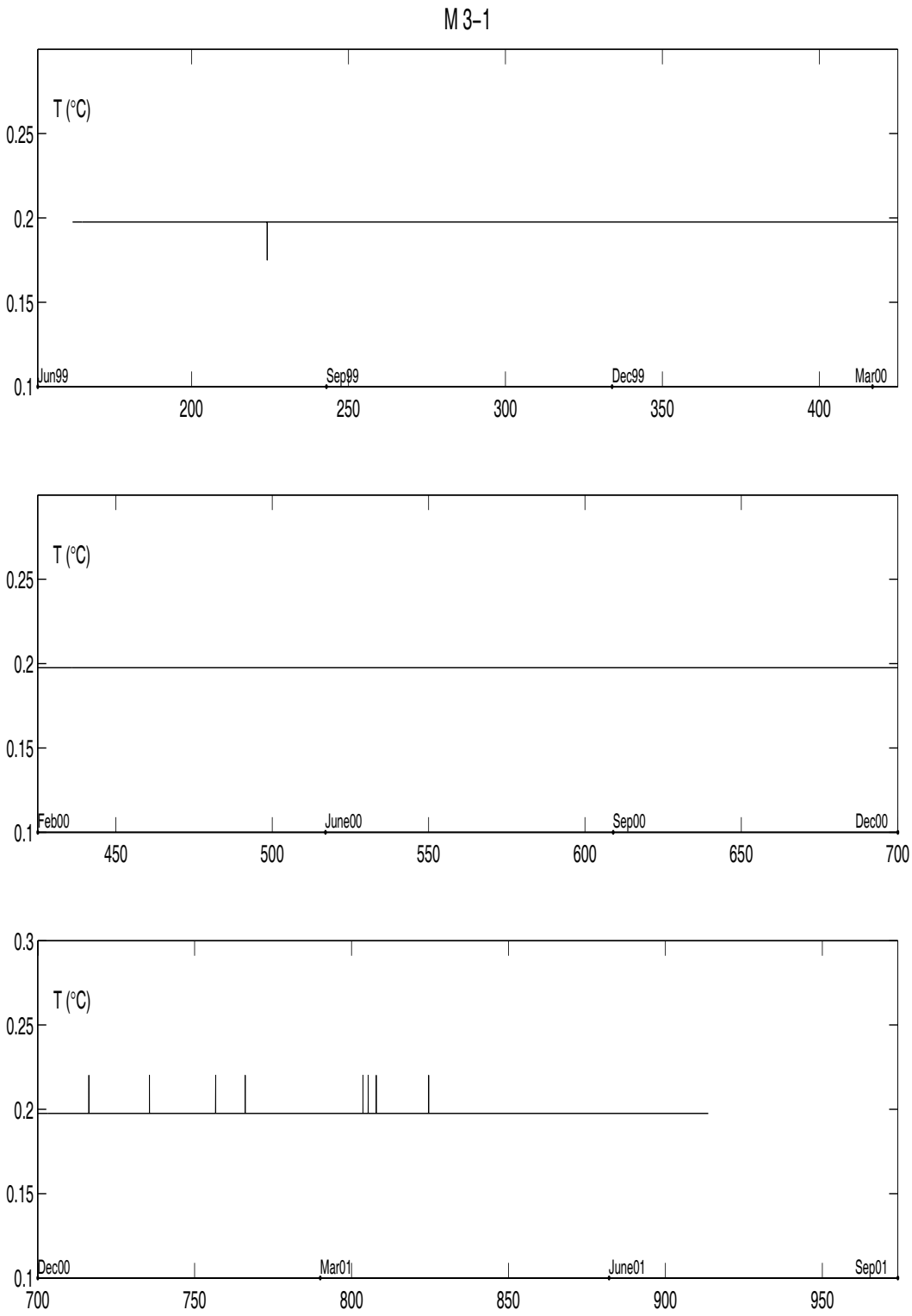

Figure 33: M3-1 Hourly Temperature

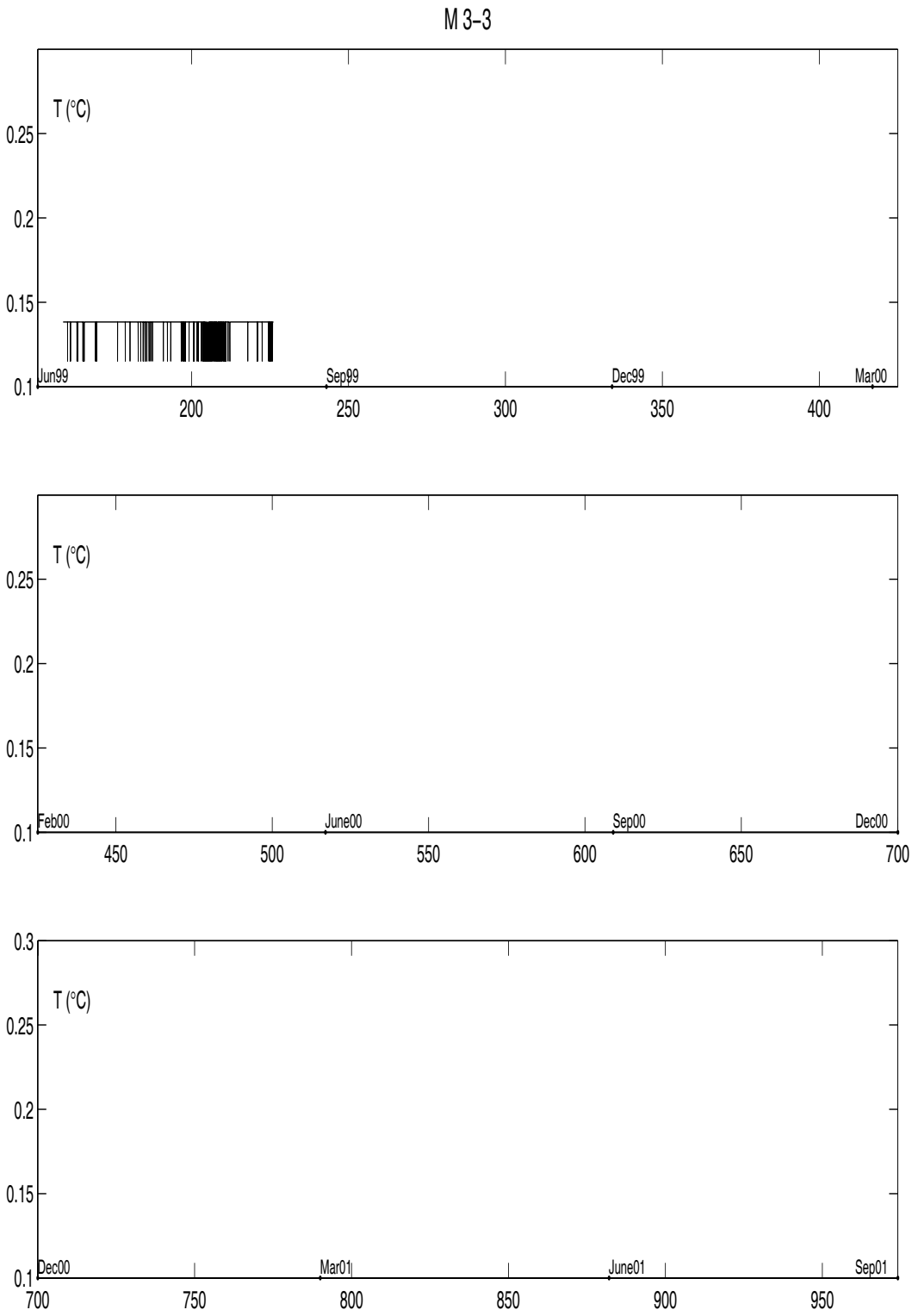

Figure 34: M3-3 Hourly Temperature

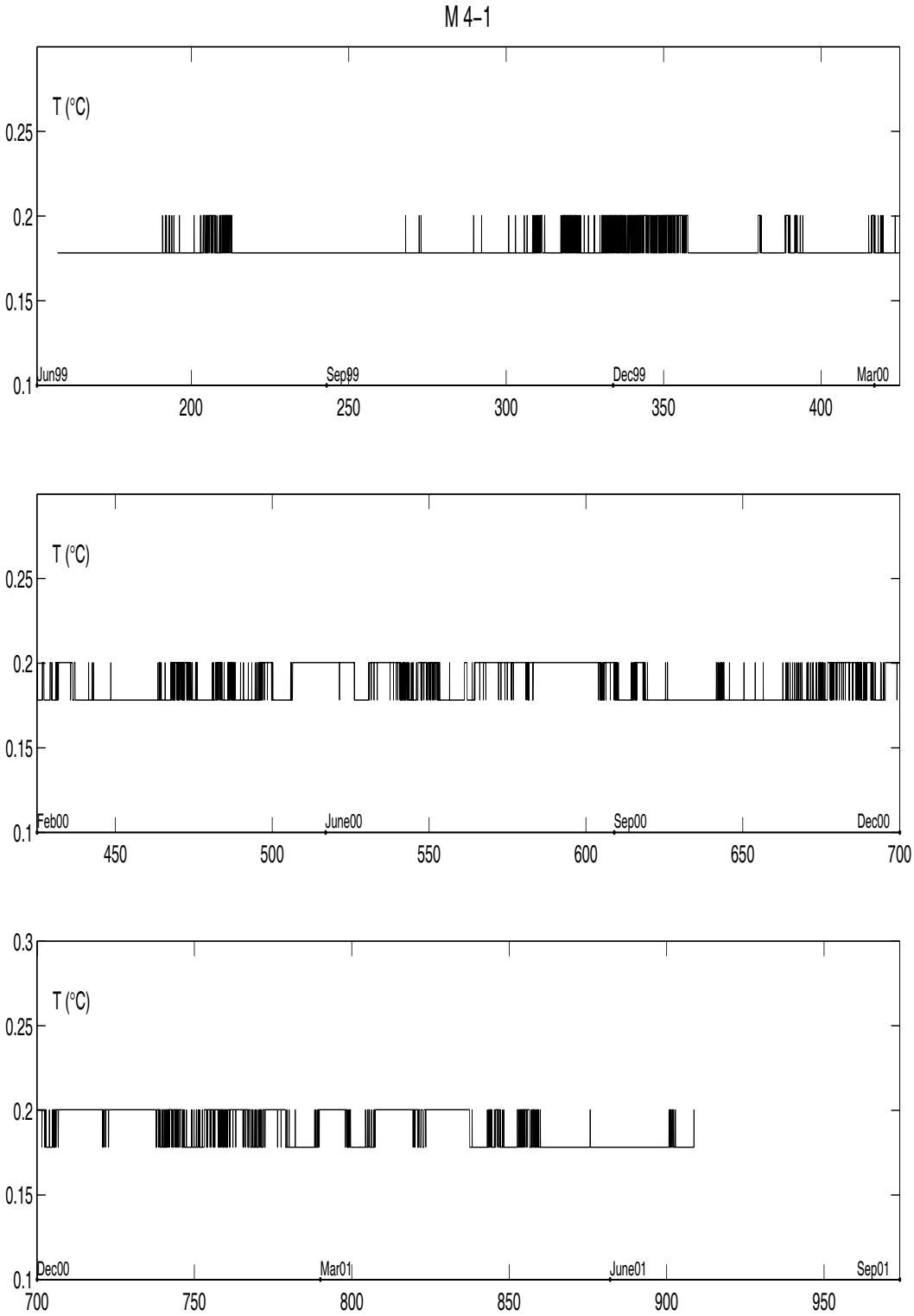

Figure 35: M4-1 Hourly Temperature

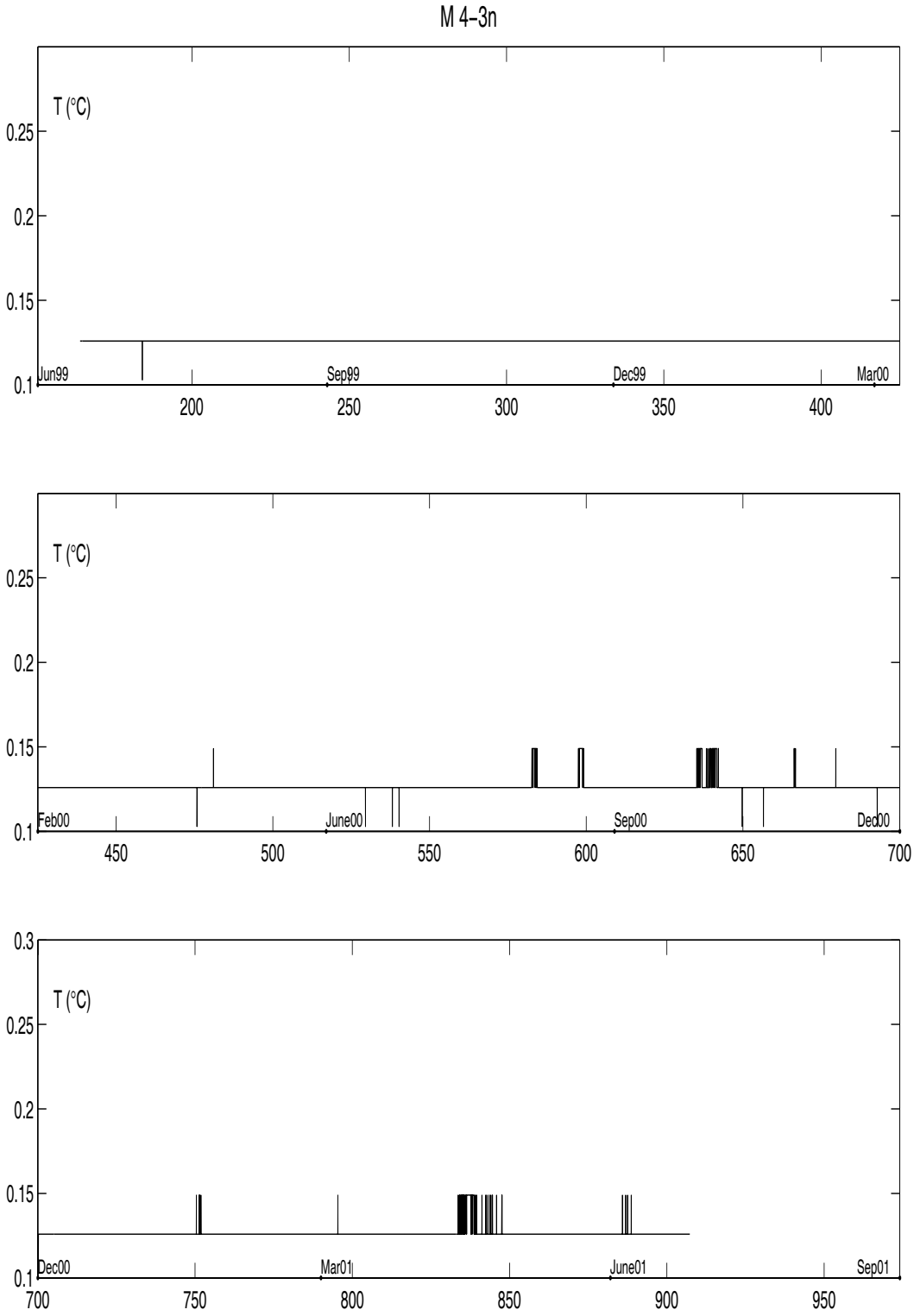

Figure 36: M4-3n Hourly Temperature

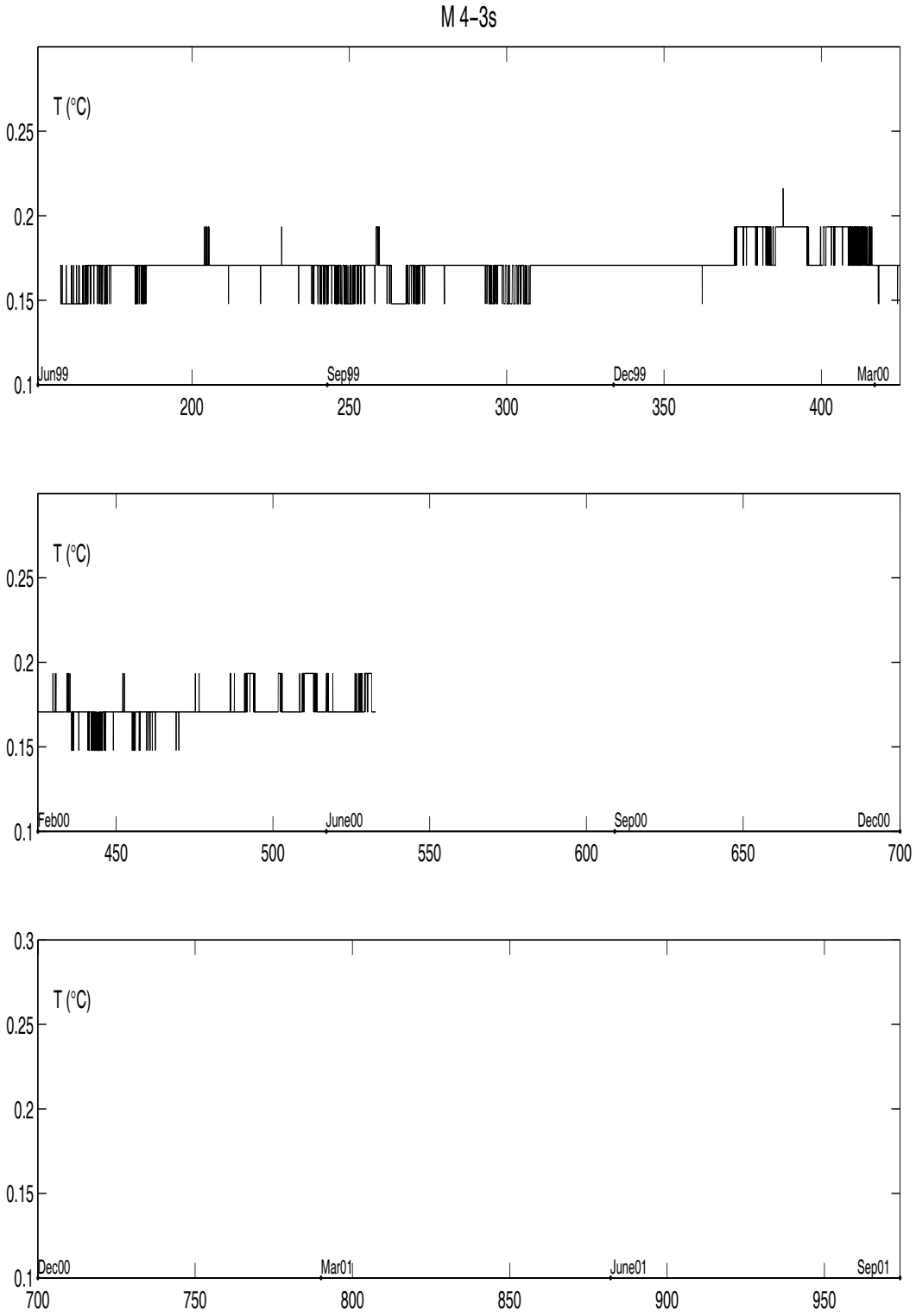

Figure 37: M4-3s Hourly Temperature

8 Acknowledgements

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9 Appendix including Korean and Japanese RCM data

We give the site and statistics information for the Korean (KORDI) and Japanese (RIAM) RCMs in Tables 8 and 9. We also give further information on all the RCM data obtained during June 1999 – June 2001, which includes:

(1) Statistics for 40 HRLP velocities (Table 10-Table 25);

(2) Stick plots of 40 HRLP current velocities for all the URI/NRL, Korean and Japanese RCMs (Figure 38);

(3) Mean current vectors and variance-ellipses plotted at each site and calculated for 2-year, yearly and seasonal periods (Figure 39)

(4) Histograms of current speed (Figure 40);

(5) Histograms of current direction (Figure 41).

Table 8: Site and Record RCM Information for the Korean and Japanese RCMs

Site			Latitude (N)	Longitude (E)	Depth (m)	DataStart (mm/dd/yy)	DataEnd (mm/dd/yy)
EC1	Leg4	L4_0400	37°22.68'	131°23.62'	361	05/24/99	10/20/99
		L4_1400			1393		
		L4_2300			2329		
	Leg5	L5_0400	37°21.62'	131°24.27'	397	10/21/99	04/18/00
		L5_1400			1378	10/21/99	05/18/00
		L5_2300			2362	10/21/99	05/18/00
	Leg6	L6_0400	37°21.56'	131°24.14'	437	05/19/00	04/12/01
		L6_1400			1464		
		L6_2300			2387		
	Leg7	L7_0400	37°19.77'	131°25.40'	332	04/13/01	10/13/01
		L7_1400			1464		
		L7_2400			2387		
EC2		L4_btme	36°4.07'	130°49.78'	1703	05/23/99	10/17/99
		L5_btme	36°4.92'	130°49.90'		10/18/99	05/25/00
		L6_btme	36°4.94'	130°49.79'		05/16/00	04/10/01
EC3		L4_btme	36°46.10'	130°49.98'	2196	05/23/99	10/19/99
		L5_btme	36°45.97'	130°50.00'	2196	10/19/99	05/22/00
		L6_btme	36°45.91'	130°49.89'	2189	05/22/00	04/14/01
		L7_0400	36°45.41'	130°50.29'	340	04/14/01	10/12/01
EC4		L4_btme	36°51.71'	129°56.69'	1282	05/25/99	10/18/99
		L5_btme	36°51.60'	129°56.41'	1206	10/19/99	05/21/00
		L6_btme	36°51.72'	129°56.41'	1196	05/22/00	04/14/01
J1		J1_11438	36°20.70'	132°8.00'	1402	06/19/99	06/06/00
		J1_11439	36°20.70'	132°8.00'	1003	06/19/99	06/06/00
		J1_9413	36°20.70'	132°8.00'	1400	06/14/00	06/03/01

Table 9: First order statistics for the Korean and Japanese RCM data

Site			Variable (u,v)	N	Min (cm/s)	Max (cm/s)	Mean (cm/s)	Std (cm/s)
EC1	Leg4	L4_0400	u	7169	-11.45	8.25	-1.77	2.88
			v		-11.2	7.79	-1.10	2.72
		L4_1400	u		-8.79	4.04	-1.39	2.22
			v		-7.85	6.48	-0.62	1.92
		L4_2300	u		-12.32	6.84	-2.42	3.22
			v		-8.96	6.87	-0.79	2.28
	Leg5	L5_0400	u	25939	-31.04	20.76	-2.02	6.09
			v		-27.92	23.15	-1.57	5.62
		L5_1400	u	10113	-8.90	7.49	-0.69	1.77
			v		-6.73	5.33	-0.74	1.43
		L5_2300	u		-9.50	9.54	-1.61	2.60
			v		-8.39	4.71	-0.87	1.86
	Leg6	L6_0400	u	15770	-11.26	14.25	-0.25	3.52
			v		-14.62	12.20	-1.57	3.42
		L4_1400	u		-8.72	9.40	-0.60	2.31
			v		-10.50	6.71	-1.11	2.24
		L6_2300	u		-11.66	9.85	-1.61	3.19
			v		-10.63	7.06	-1.38	2.63
	Leg7	L7_0400	u	8575	-11.74	9.66	-0.45	3.03
			v		-11.16	9.40	-0.59	3.03
		L4_1400	u		-9.41	7.07	-0.40	3.06
			v		-8.91	5.35	-0.76	2.59
		L7_2400	u		-7.44	6.27	-0.21	2.33
			v		-7.69	4.56	-0.42	1.63

Table 9: continued

Site			Variable (u,v)	N	Min (cm/s)	Max (cm/s)	Mean (cm/s)	Std (cm/s)
EC2	Leg4	L4_btme	u	7097	-6.88	7.23	-0.32	1.64
			v		-6.17	7.37	0.52	1.60
	Leg5	L5_btme	u	10594	-7.30	7.24	0.31	1.64
			v		-5.87	7.51	0.72	1.54
	Leg6	L6_btme	u	15351	-6.89	8.39	0.34	1.47
			v		-7.10	7.71	0.23	1.49
EC3	Leg4	L4_btme	u	7144	-6.91	9.29	1.16	2.63
			v		-9.43	8.31	-0.69	3.08
	Leg5	L5_btme	u	10357	-5.88	7.47	0.14	1.80
			v		-8.02	8.04	0.86	2.17
	Leg6	L6_btme	u	15696	-10.63	10.30	-0.44	2.68
			v		-11.37	8.38	-0.56	2.10
	Leg7	L7_0400	u	4351	-9.74	18.23	1.37	2.79
			v		-14.84	15.06	-0.05	3.04
EC4	Leg4	L4_btme	u	7032	-6.01	9.32	0.61	1.92
			v		-14.76	8.51	-6.05	3.80
	Leg5	L5_btme	u	10357	-7.44	13.62	0.90	2.22
			v		-22.94	9.92	-6.07	4.76
	Leg6	L6_btme	u	15701	-8.51	8.17	0.21	1.76
			v		-16.53	8.85	-4.38	3.41
J1	11438		u	8492	-12.00	9.27	0.01	2.72
			v		-10.81	9.38	0.54	2.59
	11439		u		-7.42	7.83	0.17	2.00
			v		-6.77	7.36	0.37	1.79
	9413		u	8586	-11.73	11.96	0.01	2.67
			v		-10.39	9.71	0.04	2.38

Table 10: Statistics table for 40 HRLP data for M1-1

M1-1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
747	9.50	0.09	1.40	0.16	-5.38	4.74	1.61	176.81	3.29
Jun99-Jun01	9.07	-1.61	2.15	0.24	-9.50	5.72	9.71	167.06	1.30
356	3.83	-0.01	1.23	0.13	-4.71	3.57	1.84	180.17	2.81
Jun99-Jun00	8.51	-1.84	2.03	0.31	-7.41	4.08	7.80	156.44	1.70
365	5.32	0.09	1.52	0.18	-5.38	4.74	1.29	175.90	3.64
Jun00-Jun01	7.61	-1.29	2.23	0.32	-9.50	5.72	9.71	167.06	0.83
92	1.96	0.41	0.90	0.13	-2.43	3.57	1.73	166.35	1.40
Jul99-Sep99	3.28	-1.68	1.41	0.27	-4.93	2.11	5.00	170.46	1.50
91	2.66	0.11	0.83	0.14	-2.00	3.38	1.38	175.41	1.33
Oct99-Dec99	6.70	-1.37	1.40	0.38	-6.20	0.77	7.00	152.06	0.95
91	2.75	-0.56	1.54	0.27	-4.71	3.18	2.00	196.27	4.68
Jan00-Mar00	7.92	-1.92	2.65	0.78	-7.18	4.08	7.80	156.44	2.00
91	2.15	-0.26	1.12	0.17	-2.98	2.97	1.79	188.46	2.56
Apr00-Jun00	4.80	-1.77	1.97	0.45	-7.41	3.51	7.46	173.83	1.60
92	2.45	0.34	1.23	0.20	-3.01	3.98	2.30	171.61	2.15
Jul00-Sep00	5.31	-2.28	1.67	0.40	-6.19	1.38	7.33	147.42	2.65
92	2.66	-0.09	1.06	0.18	-2.97	2.14	0.58	189.17	1.93
Oct00-Dec00	5.23	-0.57	1.65	0.39	-3.49	3.87	4.27	329.63	0.17
90	4.24	-0.22	1.68	0.37	-5.38	4.35	0.89	194.47	3.97
Jan01-Mar01	7.91	-0.86	2.26	0.67	-4.93	5.72	6.10	300.83	0.39
87	5.42	0.80	1.96	0.49	-4.41	4.74	2.02	156.61	6.21
Apr01-Jun01	5.20	-1.85	2.93	0.71	-9.50	5.47	9.71	167.06	2.04

Table 11: Statistics table for 40 HRLP data for M1-2

M1-2 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
661	12.84	-1.28	1.27	0.18	-8.19	3.98	3.81	340.38	3.36
Jun99-Jun01	29.99	3.59	2.26	0.48	-2.52	13.22	14.30	337.56	7.25
356	6.90	-1.34	1.24	0.17	-6.11	3.98	3.72	338.95	3.01
Jun99-Jun00	17.58	3.47	2.12	0.47	-2.52	8.77	9.45	330.28	6.93
305	5.30	-1.21	1.30	0.17	-8.19	3.04	3.91	341.96	3.74
Jun00-Jun01	24.96	3.72	2.40	0.69	-1.84	13.22	14.30	337.56	7.65
92	3.52	-1.28	1.02	0.20	-4.87	1.16	3.33	337.44	2.13
Jul99-Sep99	8.45	3.07	1.80	0.54	-0.03	7.13	7.56	340.57	5.54
91	2.89	-1.06	1.28	0.23	-4.81	3.98	2.91	338.75	3.16
Oct99-Dec99	6.79	2.71	2.17	0.59	-2.52	8.52	9.45	330.28	4.24
91	3.53	-1.12	1.14	0.22	-6.11	1.13	3.34	340.32	3.10
Jan00-Mar00	5.88	3.14	2.22	0.56	-1.45	8.29	8.74	341.42	5.57
91	3.30	-1.46	1.25	0.24	-4.55	1.48	4.90	342.64	1.85
Apr00-Jun00	4.76	4.68	1.46	0.33	-0.53	7.68	8.74	331.33	12.03
92	2.52	-0.77	0.86	0.14	-4.81	1.62	2.82	344.19	1.70
Jul00-Sep00	3.73	2.71	1.63	0.33	-0.16	7.44	7.75	343.43	3.97
71	2.54	-0.44	0.74	0.14	-2.90	0.85	1.99	347.09	1.60
Oct00-Dec00	3.98	1.94	1.63	0.39	-1.84	6.28	6.91	335.34	1.98
90	2.74	-2.29	1.52	0.27	-8.19	3.04	6.46	339.22	3.51
Jan01-Mar01	3.84	6.04	2.17	0.45	-1.43	13.22	14.30	337.56	20.84

Table 12: Statistics table for 40 HRLP data for M1-3

M1-3 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
480	4.11	-0.06	1.37	0.13	-6.01	6.01	1.16	357.09	2.71
Jun99-Jun01	5.83	1.16	1.89	0.21	-4.24	10.53	10.68	9.66	0.68
354	2.17	-0.07	1.12	0.09	-5.39	6.01	1.11	356.29	2.29
Jun99-Jun00	5.28	1.11	1.83	0.22	-4.24	10.53	10.68	9.66	0.62
92	2.11	0.00	1.27	0.19	-4.79	3.93	0.92	0.17	2.41
Jul99-Sep99	4.13	0.92	1.79	0.38	-4.24	5.84	6.28	26.83	0.43
90	2.13	-0.02	0.98	0.15	-3.61	6.01	0.84	358.69	1.29
Oct99-Dec99	3.43	0.84	1.28	0.25	-3.17	5.45	6.01	89.17	0.36
91	2.32	-0.27	1.08	0.17	-5.39	3.10	0.90	342.37	1.47
Jan00-Mar00	2.61	0.86	1.33	0.23	-3.83	5.32	5.89	246.06	0.40
65	2.16	-0.11	0.99	0.18	-4.43	2.40	1.29	355.27	2.33
Apr00-Jun00	5.00	1.29	1.92	0.53	-3.31	7.25	7.25	1.59	0.83
33	2.61	0.86	1.56	0.44	-2.42	4.49	2.39	21.19	2.42
Jan01-Mar01	2.87	2.23	1.56	0.46	-0.46	5.35	6.39	41.54	2.85
90	6.52	-0.35	1.94	0.52	-6.01	3.96	1.07	341.00	4.11
Apr01-Jun01	5.78	1.01	2.12	0.54	-3.52	6.74	6.89	11.70	0.57

Table 13: Statistics table for 40 HRLP data for M1-5

M1-5 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
737	13.73	-0.97	2.55	0.35	-11.70	9.24	1.09	243.37	4.89
Jun99-Jun01	8.46	-0.49	1.82	0.19	-9.91	6.36	11.76	264.11	0.59
353	13.35	-1.21	2.57	0.50	-11.70	4.48	1.29	249.16	4.85
Jun99-Jun00	9.81	-0.46	1.76	0.29	-8.11	3.47	11.76	264.11	0.84
365	6.04	-0.56	2.38	0.31	-8.43	9.24	0.73	230.54	4.51
Jun00-Jun01	8.23	-0.46	1.84	0.28	-9.91	6.36	10.16	193.81	0.26
92	10.81	-3.19	2.96	1.01	-11.70	1.76	3.26	258.31	5.91
Jul99-Sep99	9.04	-0.66	1.75	0.55	-5.09	3.47	11.76	264.11	5.31
91	5.58	-0.83	1.52	0.38	-5.05	1.15	1.06	231.12	3.31
Oct99-Dec99	9.14	-0.67	2.07	0.66	-8.11	2.60	9.54	211.81	0.56
91	8.50	-0.43	1.89	0.58	-6.13	2.48	0.44	278.67	2.51
Jan00-Mar00	4.34	0.07	1.21	0.26	-3.59	3.03	7.01	240.58	0.10
91	10.04	0.19	2.55	0.85	-6.87	5.02	0.70	164.33	4.93
Apr00-Jun00	8.20	-0.68	1.84	0.55	-5.43	2.44	8.06	238.47	0.25
92	5.74	-0.29	3.66	0.91	-8.43	9.24	0.74	203.13	10.83
Jul00-Sep00	5.54	-0.68	2.87	0.71	-9.91	6.36	10.16	193.81	0.28
92	4.77	-0.22	1.36	0.31	-4.49	2.34	0.44	209.54	2.07
Oct00-Dec00	5.42	-0.38	1.51	0.37	-6.25	2.97	6.40	167.63	0.10
90	5.44	-1.42	1.54	0.38	-5.46	1.02	1.53	248.74	1.80
Jan01-Mar01	5.24	-0.55	1.11	0.27	-3.84	1.87	5.95	244.62	1.17
81	8.03	-1.75	2.28	0.72	-7.50	2.11	1.81	254.42	3.74
Apr01-Jun01	5.68	-0.49	1.50	0.40	-5.24	2.67	8.07	247.38	1.64

Table 14: Statistics table for 40 HRLP data for M2-1

M2-1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
746	5.15	-0.28	1.76	0.15	-12.12	15.63	1.54	349.48	7.30
Jun99-Jun01	13.01	1.52	3.39	0.45	-8.02	19.02	19.16	352.71	1.19
354	6.56	-0.44	1.77	0.24	-12.12	5.71	1.53	343.49	7.54
Jun99-Jun00	7.22	1.47	3.45	0.49	-8.02	16.77	17.12	347.92	1.17
365	5.11	-0.14	1.79	0.21	-6.98	15.63	1.53	354.76	7.35
Jun00-Jun01	12.94	1.52	3.39	0.64	-6.08	19.02	19.16	352.71	1.16
92	4.67	-0.33	0.81	0.18	-3.13	1.98	0.68	331.53	1.31
Jul99-Sep99	7.37	0.60	1.40	0.40	-2.43	6.37	6.37	359.90	0.23
91	4.59	-1.10	2.82	0.63	-12.12	5.71	3.79	343.11	13.89
Oct99-Dec99	6.48	3.63	4.45	1.19	-6.23	16.77	17.12	347.92	7.18
91	4.91	-0.08	1.44	0.33	-5.79	4.54	0.68	353.09	6.93
Jan00-Mar00	4.64	0.67	3.43	0.78	-8.02	12.46	12.50	4.71	0.23
91	3.84	-0.13	0.88	0.18	-3.05	2.50	0.78	350.43	3.40
Apr00-Jun00	2.97	0.77	2.45	0.44	-6.86	10.34	10.39	353.87	0.31
92	7.64	-0.34	1.22	0.35	-4.04	2.03	0.37	294.67	3.05
Jul00-Sep00	3.47	0.16	2.15	0.42	-6.08	5.80	6.33	163.83	0.07
92	2.85	-0.39	0.82	0.14	-3.27	2.76	1.26	341.93	2.48
Oct00-Dec00	6.84	1.20	2.07	0.56	-1.72	8.05	8.29	345.98	0.79
90	5.26	0.14	3.08	0.75	-6.13	15.63	3.52	2.22	17.78
Jan01-Mar01	5.47	3.52	5.11	1.26	-3.16	19.02	19.16	352.71	6.19
89	2.87	-0.07	1.08	0.19	-6.98	2.21	1.73	357.55	4.01
Apr01-Jun01	7.06	1.73	2.62	0.74	-4.35	8.24	9.34	311.84	1.49

Table 15: Statistics table for 40 HRLP data for M2-2

M2-2 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
709	12.77	-0.31	2.30	0.31	-7.06	9.15	0.40	310.28	4.18
Jun99-Jun01	8.31	0.26	1.76	0.19	-6.52	6.28	9.16	87.25	0.08
317	10.66	-0.09	2.33	0.43	-7.06	6.65	0.37	345.68	4.69
Jun99-Jun00	7.90	0.35	1.98	0.31	-6.38	6.28	8.50	47.85	0.07
365	12.72	-0.39	2.25	0.42	-5.28	9.15	0.45	301.62	3.74
Jun00-Jun01	7.75	0.24	1.55	0.23	-6.52	4.78	9.16	87.25	0.10
77	8.53	0.17	1.75	0.58	-3.34	5.95	0.30	144.80	2.34
Jul99-Sep99	4.39	-0.24	1.28	0.31	-4.12	3.94	6.03	80.70	0.04
91	11.07	-0.74	2.21	0.77	-6.98	4.92	0.85	299.12	5.09
Oct99-Dec99	5.35	0.41	2.30	0.56	-6.38	6.28	7.22	285.18	0.36
91	4.75	0.41	2.79	0.64	-6.48	6.65	1.09	22.04	5.91
Jan00-Mar00	8.80	1.01	2.00	0.62	-4.18	5.82	8.50	47.85	0.60
87	9.92	-0.08	1.97	0.66	-7.06	3.19	0.26	341.01	3.53
Apr00-Jun00	9.67	0.24	1.79	0.60	-3.89	4.78	7.35	289.59	0.03
92	13.09	0.54	3.05	1.15	-4.46	9.15	0.62	118.80	6.54
Jul00-Sep00	6.31	-0.30	1.95	0.51	-6.52	3.50	9.16	87.25	0.19
92	8.54	-0.43	1.36	0.42	-2.84	2.12	0.48	295.30	1.44
Oct00-Dec00	7.21	0.20	1.01	0.28	-2.37	2.13	3.23	311.14	0.11
90	12.67	-0.14	1.75	0.66	-3.73	3.79	0.26	327.73	2.47
Jan01-Mar01	7.51	0.22	1.37	0.40	-2.94	4.03	4.17	313.44	0.04
88	6.88	-2.16	1.70	0.47	-5.28	2.60	2.21	281.93	2.67
Apr01-Jun01	3.94	0.46	1.57	0.33	-3.69	4.55	6.59	308.71	2.43

Table 16: Statistics table for 40 HRLP data for M3-1

M3-1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
748	12.67	-0.48	0.86	0.11	-6.17	3.91	2.70	190.26	2.65
Jun99-Jun01	19.26	-2.66	2.13	0.34	-8.21	2.68	8.37	191.40	3.64
354	11.55	-0.26	0.94	0.17	-4.95	3.91	2.61	185.78	2.67
Jun99-Jun00	20.82	-2.60	2.11	0.51	-7.52	2.68	7.52	178.77	3.41
365	5.14	-0.68	0.65	0.08	-3.51	1.62	2.95	193.43	2.44
Jun00-Jun01	16.37	-2.87	2.11	0.45	-8.21	1.81	8.37	191.40	4.35
92	2.50	0.35	0.73	0.12	-2.13	1.97	3.17	173.61	1.35
Jul99-Sep99	6.53	-3.15	1.47	0.39	-7.52	-0.05	7.52	178.77	5.01
91	3.08	-0.61	0.97	0.18	-4.95	3.91	2.88	192.17	4.41
Oct99-Dec99	8.11	-2.82	2.81	0.84	-7.35	2.68	7.44	188.59	4.15
91	1.98	-0.59	0.80	0.12	-4.08	3.20	2.92	191.73	1.70
Jan00-Mar00	6.04	-2.86	1.66	0.43	-6.72	0.38	6.94	194.31	4.28
91	2.53	-0.48	0.88	0.15	-3.26	2.17	2.48	191.21	3.78
Apr00-Jun00	6.70	-2.44	2.61	0.71	-8.21	2.18	8.37	191.40	3.09
92	2.64	-0.86	0.77	0.13	-3.51	0.74	3.29	195.17	3.71
Jul00-Sep00	6.62	-3.17	2.61	0.70	-7.11	1.81	7.35	194.72	5.41
92	4.70	-0.59	0.49	0.11	-1.45	0.94	2.10	196.27	0.97
Oct00-Dec00	9.62	-2.01	1.30	0.42	-6.05	0.50	6.14	190.13	2.20
90	6.72	-0.70	0.53	0.15	-2.04	1.16	2.94	193.82	1.71
Jan01-Mar01	13.98	-2.85	1.77	0.70	-6.73	0.81	6.75	185.02	4.31
91	2.66	-0.52	0.99	0.17	-6.17	1.62	2.27	193.33	2.62
Apr01-Jun01	9.38	-2.21	2.07	0.66	-7.02	1.11	7.12	189.55	2.57

Table 17: Statistics table for 40 HRLP data for M3-3

M3-3 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
59	11.31	0.16	1.46	0.64	-3.21	3.72	1.32	7.05	2.64
Jun99-Jun00	7.86	1.31	1.77	0.64	-1.06	6.82	7.77	28.60	0.87
42	4.34	-0.29	1.29	0.41	-3.21	2.31	0.94	341.83	1.35
Jul99-Sep99	7.53	0.89	1.01	0.43	-1.06	3.40	3.47	348.35	0.44

Table 18: Statistics table for 40 HRLP data for M4-1

M4-1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
748	4.51	0.24	0.95	0.07	-3.32	3.94	0.24	98.14	0.91
Jun99-Jun01	4.75	-0.03	0.96	0.08	-4.29	3.42	4.46	196.10	0.03
359	6.31	0.40	0.99	0.13	-3.32	3.94	0.42	106.18	1.00
Jun99-Jun00	4.59	-0.12	1.01	0.11	-4.29	3.42	4.46	196.10	0.09
365	4.05	0.09	0.90	0.09	-2.47	3.09	0.13	47.34	0.80
Jun00-Jun01	4.33	0.09	0.89	0.10	-2.60	3.33	3.43	14.86	0.01
92	5.82	0.25	0.82	0.21	-2.18	2.51	0.27	107.61	0.73
Jul99-Sep99	5.53	-0.08	0.89	0.22	-2.54	2.30	3.22	219.43	0.04
91	3.92	0.19	0.63	0.13	-1.37	1.83	0.27	45.77	0.45
Oct99-Dec99	2.93	0.19	0.71	0.13	-1.67	1.77	1.85	81.79	0.04
91	3.54	0.87	1.36	0.27	-3.32	3.94	0.90	103.83	1.83
Jan00-Mar00	4.53	-0.22	1.35	0.30	-4.29	3.42	4.46	196.10	0.41
91	5.15	0.20	0.81	0.19	-2.01	3.22	0.37	148.18	0.73
Apr00-Jun00	3.53	-0.32	0.90	0.18	-3.30	1.94	3.37	191.11	0.07
92	2.63	0.09	0.79	0.13	-2.01	2.20	0.34	163.81	0.52
Jul00-Sep00	3.98	-0.33	0.64	0.13	-1.55	1.92	2.31	125.97	0.06
92	5.78	0.01	0.90	0.23	-2.47	2.25	0.23	1.94	0.78
Oct00-Dec00	4.27	0.23	0.87	0.19	-2.14	2.85	3.15	334.73	0.03
90	4.67	0.27	1.01	0.23	-1.56	3.09	0.33	54.82	1.10
Jan01-Mar01	4.11	0.19	1.08	0.23	-2.53	3.33	3.43	14.86	0.05
86	3.92	-0.01	0.87	0.19	-2.18	2.22	0.06	353.11	0.79
Apr01-Jun01	4.38	0.06	0.91	0.20	-2.60	2.02	3.00	210.98	0.00

Table 19: Statistics table for 40 HRLP data for M4-3n

M4-3n Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
739	6.95	0.66	1.88	0.18	-5.04	6.73	0.76	59.52	2.96
Jun99-Jun01	4.57	0.39	1.55	0.12	-4.30	5.70	6.98	124.76	0.29
352	9.89	0.68	1.76	0.30	-3.84	6.73	0.72	70.54	2.39
Jun99-Jun00	4.92	0.24	1.30	0.15	-3.97	5.43	6.87	101.74	0.26
365	5.83	0.65	2.00	0.25	-5.04	5.97	0.82	52.04	3.52
Jun00-Jun01	4.41	0.50	1.74	0.19	-4.30	5.70	6.98	124.76	0.33
92	12.42	0.29	2.39	0.88	-3.84	6.25	0.52	34.25	3.30
Jul99-Sep99	3.86	0.43	0.94	0.19	-2.62	3.97	6.58	65.85	0.14
91	7.60	0.99	1.20	0.35	-1.69	3.46	0.99	88.21	1.27
Oct99-Dec99	3.81	0.03	1.05	0.22	-2.52	2.97	3.86	116.39	0.49
91	6.91	0.43	1.39	0.38	-2.89	3.33	0.51	56.25	2.03
Jan00-Mar00	4.12	0.29	1.46	0.31	-3.97	4.50	5.34	327.43	0.13
91	5.82	1.30	1.92	0.49	-2.62	6.73	1.32	77.96	3.75
Apr00-Jun00	4.58	0.28	1.96	0.44	-3.95	5.43	6.87	101.74	0.88
92	4.70	0.79	2.41	0.54	-3.90	5.86	1.15	43.33	4.69
Jul00-Sep00	4.03	0.84	1.89	0.40	-4.03	5.49	6.98	124.76	0.66
92	6.85	0.48	2.01	0.55	-4.74	5.97	0.64	48.27	3.56
Oct00-Dec00	5.10	0.43	1.76	0.41	-4.30	5.70	6.22	132.86	0.21
90	5.71	0.79	1.25	0.31	-2.34	3.13	0.90	60.85	1.72
Jan01-Mar01	4.30	0.44	1.38	0.30	-2.88	3.15	3.46	146.19	0.40
85	5.86	0.11	1.89	0.50	-5.04	3.72	0.52	12.60	2.87
Apr01-Jun01	4.61	0.51	1.48	0.35	-3.51	3.67	5.57	299.20	0.13

Table 20: Statistics table for 40 HRLP data for M4-3s

M4-3s Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
358	5.28	1.10	1.95	0.24	-4.18	8.63	1.12	80.20	2.71
Jun99-Jun00	4.74	0.19	1.28	0.15	-3.23	7.31	8.63	89.81	0.63
92	5.71	1.07	2.38	0.59	-4.18	8.63	1.11	75.40	4.31
Jul99-Sep99	7.00	0.28	1.71	0.47	-2.33	7.31	8.63	89.81	0.62
91	7.21	0.91	1.55	0.44	-2.52	5.25	0.91	86.15	1.58
Oct99-Dec99	4.56	0.06	0.87	0.19	-2.06	2.92	5.26	91.66	0.42
91	4.52	1.31	1.91	0.43	-3.47	6.48	1.33	79.35	2.59
Jan00-Mar00	2.60	0.25	1.24	0.21	-3.23	4.83	6.51	95.24	0.89
75	4.49	0.90	2.07	0.51	-3.53	4.77	0.98	66.18	3.11
Apr00-Jun00	3.72	0.40	1.38	0.31	-2.19	4.27	4.98	322.10	0.48

Table 21: Statistics table for 40 HRLP data for EC1

EC1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
777	9.25	-1.55	2.69	0.29	-10.32	8.54	1.87	235.78	5.59
Jun99-Jun01	10.73	-1.05	1.99	0.23	-9.42	3.70	12.23	225.69	1.75
354	7.73	-1.82	2.43	0.36	-10.32	5.74	2.04	243.56	4.13
Jun99-Jun00	7.27	-0.91	1.54	0.22	-6.97	3.04	10.44	228.27	2.07
356	8.65	-1.51	2.80	0.44	-9.66	8.54	1.96	230.38	6.66
Jun00-Jun01	9.65	-1.25	2.34	0.39	-9.42	3.70	12.23	225.69	1.92
89	7.28	-1.78	2.61	0.74	-10.32	4.47	1.96	245.40	4.59
Jul99-Sep99	6.96	-0.82	1.55	0.43	-6.72	3.04	10.32	270.06	1.92
87	4.80	-1.59	1.52	0.36	-5.75	2.09	1.66	254.16	1.77
Oct99-Dec99	5.14	-0.45	1.12	0.27	-3.11	1.87	5.96	254.76	1.37
91	3.53	-1.95	2.28	0.45	-8.21	3.87	2.25	240.14	3.76
Jan00-Mar00	4.87	-1.12	1.52	0.35	-5.24	2.58	9.36	237.99	2.52
84	7.79	-0.94	2.41	0.74	-6.92	5.74	1.19	231.82	3.70
Apr00-Jun00	5.47	-0.74	1.26	0.32	-6.96	1.07	8.85	218.24	0.71
92	6.26	-3.01	3.09	0.80	-9.66	2.34	4.35	223.78	9.25
Jul00-Sep00	6.42	-3.14	3.00	0.79	-9.42	2.18	12.23	225.69	9.47
89	8.69	-0.74	1.45	0.45	-5.25	2.05	0.87	238.56	1.49
Oct00-Dec00	5.34	-0.45	0.94	0.23	-3.92	2.14	6.52	233.10	0.38
90	7.76	-1.51	3.58	1.05	-9.34	8.54	1.80	236.86	8.78
Jan01-Mar01	8.03	-0.99	2.19	0.65	-6.48	3.70	10.72	240.36	1.63
87	9.37	-1.05	2.08	0.68	-6.57	1.85	1.26	236.80	3.93
Apr01-Jun01	7.69	-0.69	1.88	0.56	-6.89	2.83	8.36	214.59	0.79

Table 22: Statistics table for 40 HRLP data for EC2

EC2 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
670	7.09	0.20	1.01	0.10	-3.10	3.92	0.50	24.24	0.89
Jun99-Jun01	4.59	0.45	0.87	0.07	-2.53	3.84	4.24	67.71	0.12
359	7.50	0.08	1.08	0.16	-3.10	3.92	0.64	7.16	0.92
Jun99-Jun00	4.51	0.64	0.82	0.09	-1.62	3.52	4.24	67.71	0.21
311	5.97	0.35	0.91	0.13	-2.86	3.57	0.42	55.47	0.78
Jun00-Jun01	4.08	0.24	0.86	0.10	-2.53	3.84	3.84	358.14	0.09
92	6.26	-0.50	0.79	0.21	-2.28	1.60	0.76	319.44	0.59
Jul99-Sep99	5.20	0.58	0.75	0.18	-0.93	2.89	3.31	326.55	0.29
87	6.77	-0.04	0.56	0.16	-1.62	1.68	0.34	353.76	0.23
Oct99-Dec99	2.44	0.34	0.38	0.06	-0.61	1.40	1.69	93.64	0.06
91	5.89	0.37	1.29	0.33	-3.10	3.92	1.00	21.53	1.18
Jan00-Mar00	3.88	0.93	0.82	0.17	-1.62	3.47	4.24	67.71	0.50
87	6.17	0.56	0.93	0.25	-1.40	3.33	0.84	41.53	0.95
Apr00-Jun00	4.10	0.63	1.02	0.22	-1.19	3.52	3.72	59.73	0.35
92	5.66	0.23	0.79	0.20	-2.13	2.78	0.30	48.94	0.51
Jul00-Sep00	3.88	0.20	0.64	0.13	-1.24	2.46	2.78	87.52	0.05
92	6.28	0.40	1.06	0.28	-2.14	3.57	0.46	61.23	0.83
Oct00-Dec00	3.62	0.22	0.73	0.14	-1.57	2.53	3.65	78.34	0.11
90	4.58	0.46	0.90	0.20	-2.86	2.58	0.51	63.45	1.03
Jan01-Mar01	3.81	0.23	1.12	0.23	-2.53	3.84	3.84	358.14	0.13

Table 23: Statistics table for 40 HRLP data for EC3

EC3 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
669	20.18	0.04	2.11	0.37	-7.35	6.77	0.14	160.54	4.09
Jun99-Jun01	14.83	-0.13	1.93	0.29	-9.14	5.03	9.42	195.26	0.01
355	10.66	0.50	1.67	0.29	-3.43	6.77	0.57	61.28	3.53
Jun99-Jun00	11.09	0.27	2.06	0.36	-6.45	5.03	8.51	127.30	0.16
315	23.31	-0.47	2.41	0.66	-7.35	5.09	0.74	218.90	4.29
Jun00-Jun01	15.93	-0.58	1.66	0.37	-9.14	3.48	9.42	195.26	0.28
89	5.50	0.73	1.62	0.40	-2.92	5.64	1.02	134.28	3.69
Jul99-Sep99	8.74	-0.71	2.18	0.68	-6.45	3.87	6.70	160.86	0.52
87	7.30	0.57	2.04	0.59	-2.77	6.77	0.68	56.31	4.57
Oct99-Dec99	9.81	0.38	2.23	0.75	-5.98	4.51	8.51	127.30	0.23
91	6.58	-0.16	0.94	0.25	-3.43	1.75	0.84	348.89	1.21
Jan00-Mar00	11.44	0.83	1.24	0.44	-3.02	3.85	4.20	305.46	0.35
86	13.15	0.59	1.08	0.42	-1.47	3.26	0.61	73.51	1.96
Apr00-Jun00	8.60	0.17	1.66	0.52	-3.51	4.87	4.87	358.27	0.19
92	15.75	-2.11	3.82	1.58	-7.35	5.09	2.20	253.06	10.75
Jul00-Sep00	12.48	-0.64	2.63	0.97	-9.14	3.48	9.42	195.26	2.42
92	7.03	0.57	0.78	0.22	-1.09	2.86	0.58	104.32	0.81
Oct00-Dec00	4.09	-0.14	1.00	0.21	-2.51	3.29	3.49	124.84	0.17
90	4.09	0.05	0.74	0.16	-1.64	2.29	0.66	175.65	0.58
Jan01-Mar01	8.24	-0.66	0.78	0.24	-3.04	1.97	3.11	192.33	0.22

Table 24: Statistics table for 40 HRLP data for EC4

EC4 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
673	15.06	0.52	1.09	0.16	-4.58	4.14	5.30	174.32	7.45
Jun99-Jun01	12.01	-5.27	3.70	0.49	-18.53	6.09	18.54	181.89	14.03
359	6.87	0.77	1.07	0.15	-2.34	4.14	6.10	172.75	8.65
Jun99-Jun00	12.68	-6.05	4.02	0.76	-18.53	6.09	18.54	181.89	18.62
314	10.29	0.24	1.05	0.19	-4.58	2.40	4.38	176.82	5.26
Jun00-Jun01	8.74	-4.38	3.07	0.51	-12.93	4.14	12.93	181.29	9.61
92	7.19	0.78	0.87	0.24	-2.34	2.99	6.99	173.59	3.20
Jul99-Sep99	4.04	-6.95	2.37	0.50	-11.72	0.05	12.08	165.81	24.44
87	6.46	0.49	0.94	0.26	-1.42	4.14	3.43	171.79	6.70
Oct99-Dec99	7.80	-3.40	3.54	1.06	-13.58	5.15	13.58	179.69	5.89
91	4.76	0.97	1.25	0.29	-1.96	4.14	6.85	171.84	14.54
Jan00-Mar00	8.43	-6.78	5.25	1.60	-18.53	6.09	18.54	181.89	23.48
87	4.89	0.92	0.95	0.22	-1.96	3.27	6.82	172.25	3.84
Apr00-Jun00	6.88	-6.76	2.61	0.73	-13.39	0.09	13.46	174.50	23.27
92	2.85	0.81	0.62	0.11	-2.37	2.36	6.09	172.35	4.36
Jul00-Sep00	5.29	-6.03	2.89	0.69	-12.93	-0.03	12.93	181.29	18.54
92	3.98	0.68	0.63	0.13	-1.22	2.40	3.16	167.62	2.72
Oct00-Dec00	6.55	-3.08	2.25	0.60	-8.38	1.76	8.40	176.02	4.98
90	5.68	-0.84	1.00	0.25	-4.58	1.48	3.95	192.21	6.86
Jan01-Mar01	9.17	-3.86	3.57	1.14	-11.36	4.14	12.17	201.36	7.81

Table 25: Statistics table for 40 HRLP data for J1

J1 Statistics									
No. Days	IT_u (day)	$\overline{U}$	σ_u	SE_u	U_{min}	U_{max}	Spd	Dir	EKE
Time Period	IT_v (day)	$\overline{V}$	σ_v	SE_v	V_{min}	V_{max}	Spd_{max}	Dir_{max}	MKE
705	3.80	0.00	1.68	0.12	-5.10	8.13	0.27	1.00	2.30
Jun99-Jun01	5.06	0.27	1.34	0.11	-5.17	7.70	10.23	48.89	0.04
347	3.51	-0.00	1.60	0.16	-5.10	5.67	0.51	359.91	2.08
Jun99-Jun00	6.57	0.51	1.26	0.17	-3.17	5.60	6.01	70.30	0.13
354	4.07	-0.00	1.75	0.19	-4.73	8.13	0.03	357.88	2.46
Jun00-Jun01	4.56	0.03	1.37	0.16	-5.17	7.70	10.23	48.89	0.00
92	4.59	-0.22	1.47	0.33	-4.54	3.03	0.40	326.53	1.87
Jul99-Sep99	4.61	0.33	1.26	0.28	-3.17	2.88	4.56	275.84	0.08
91	3.77	0.03	1.18	0.24	-2.52	5.55	0.60	3.06	1.27
Oct99-Dec99	4.75	0.60	1.07	0.24	-1.82	4.04	5.66	78.38	0.18
91	3.18	-0.14	2.07	0.39	-5.10	5.67	0.56	345.96	3.50
Jan00-Mar00	4.02	0.54	1.64	0.35	-2.95	5.60	6.01	70.30	0.16
80	2.86	0.08	1.22	0.23	-3.63	5.54	0.58	7.78	1.12
Apr00-Jun00	3.84	0.57	0.87	0.19	-2.47	3.29	5.90	69.89	0.17
92	3.74	0.25	2.27	0.46	-4.19	8.13	0.30	56.13	4.08
Jul00-Sep00	3.73	0.17	1.73	0.35	-5.17	7.70	10.23	48.89	0.05
92	5.43	-0.22	1.64	0.40	-4.53	4.04	0.46	207.87	2.11
Oct00-Dec00	4.30	-0.41	1.24	0.27	-4.16	2.80	5.21	223.97	0.11
90	3.98	-0.03	1.34	0.28	-3.95	3.33	0.14	346.19	1.41
Jan01-Mar01	3.72	0.14	1.02	0.21	-2.52	2.68	4.06	127.76	0.01
65	3.87	0.04	1.55	0.38	-4.73	3.96	0.12	19.30	2.01
Apr01-Jun01	4.98	0.11	1.28	0.35	-3.36	3.80	5.00	46.49	0.01

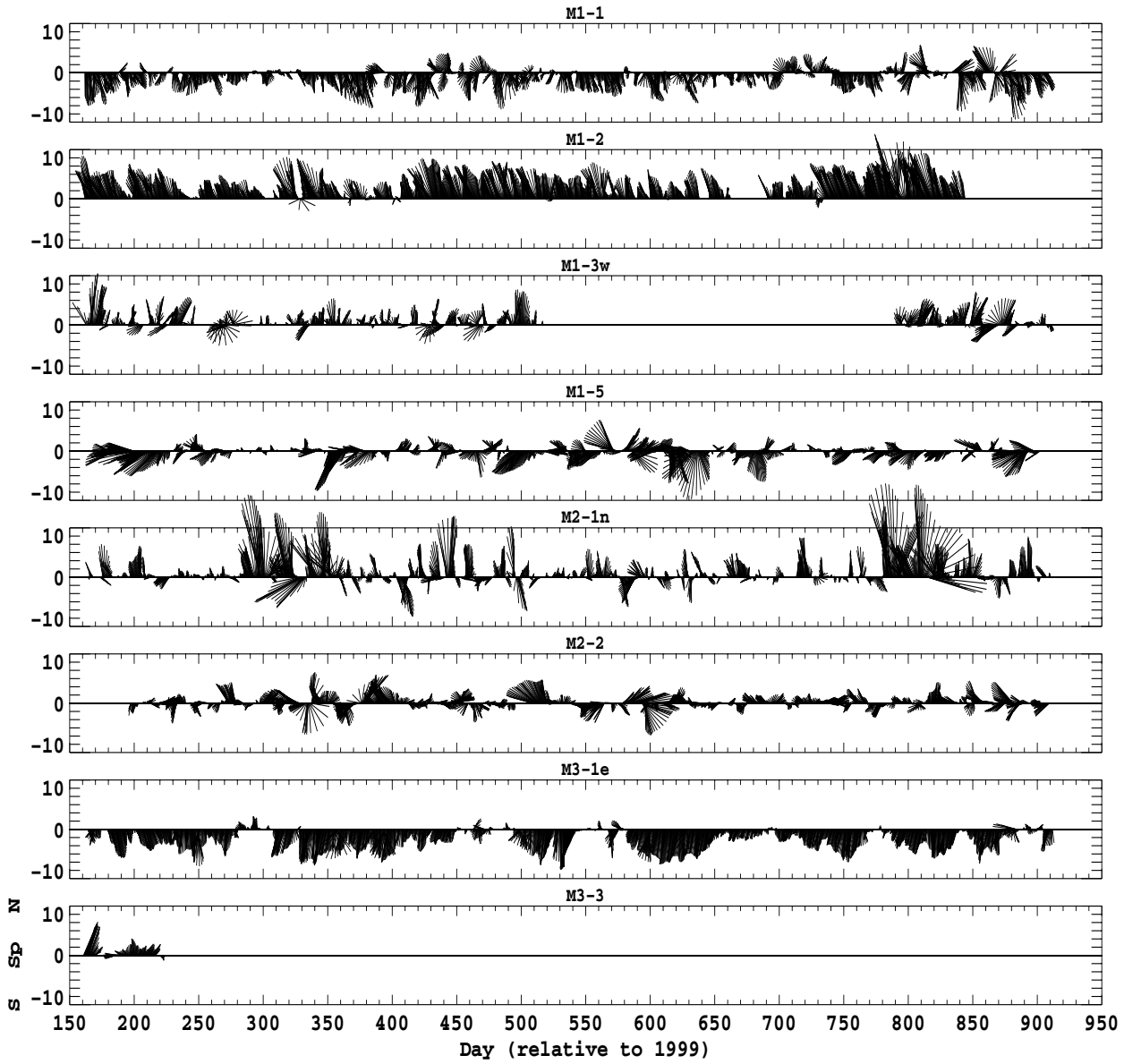

Figure 38: Stick plots of the velocities for all the URI/NRL, Korean, and Japanese RCMs. Time axis is in days since the beginning of 1999

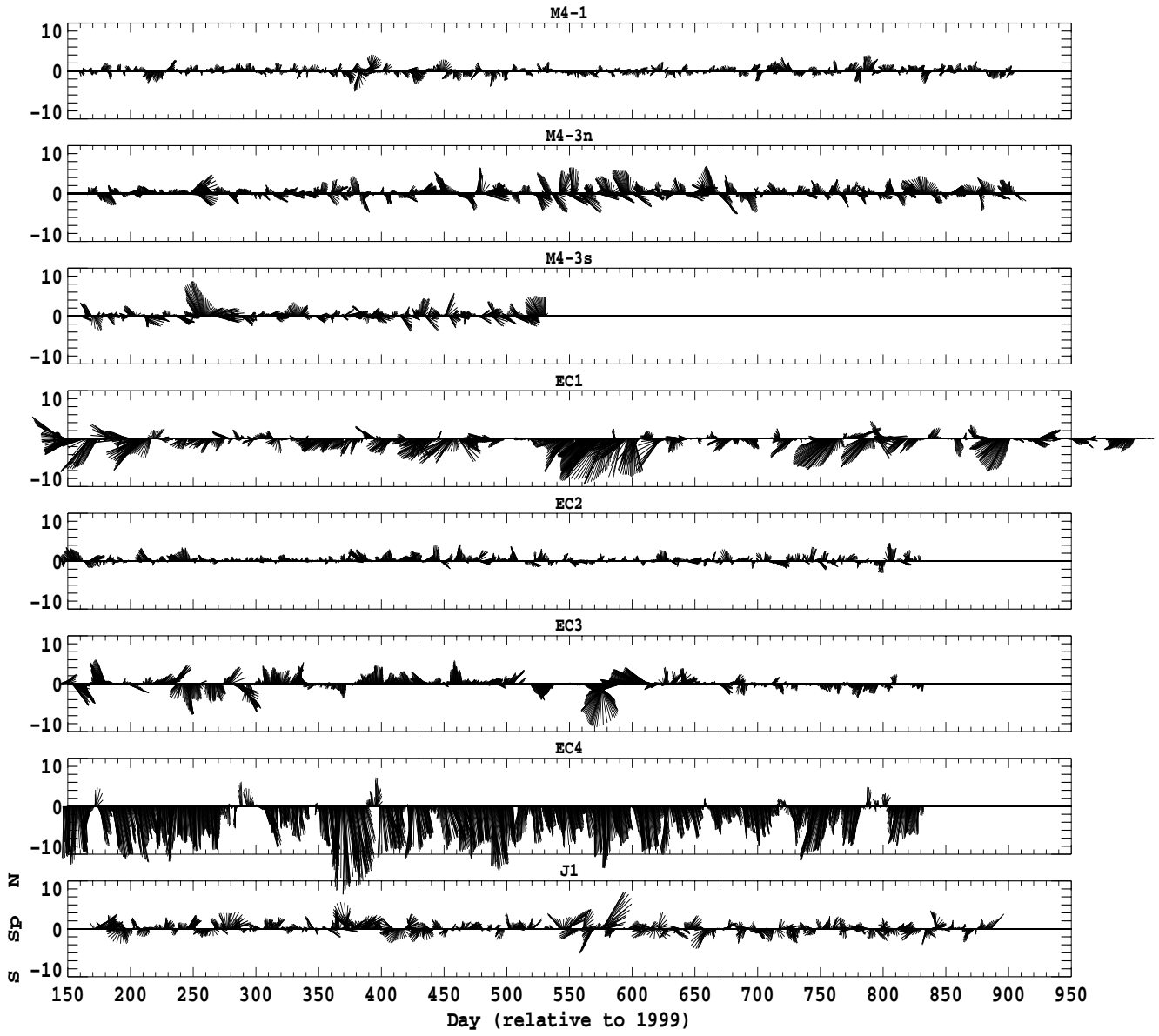

Figure 38: continued

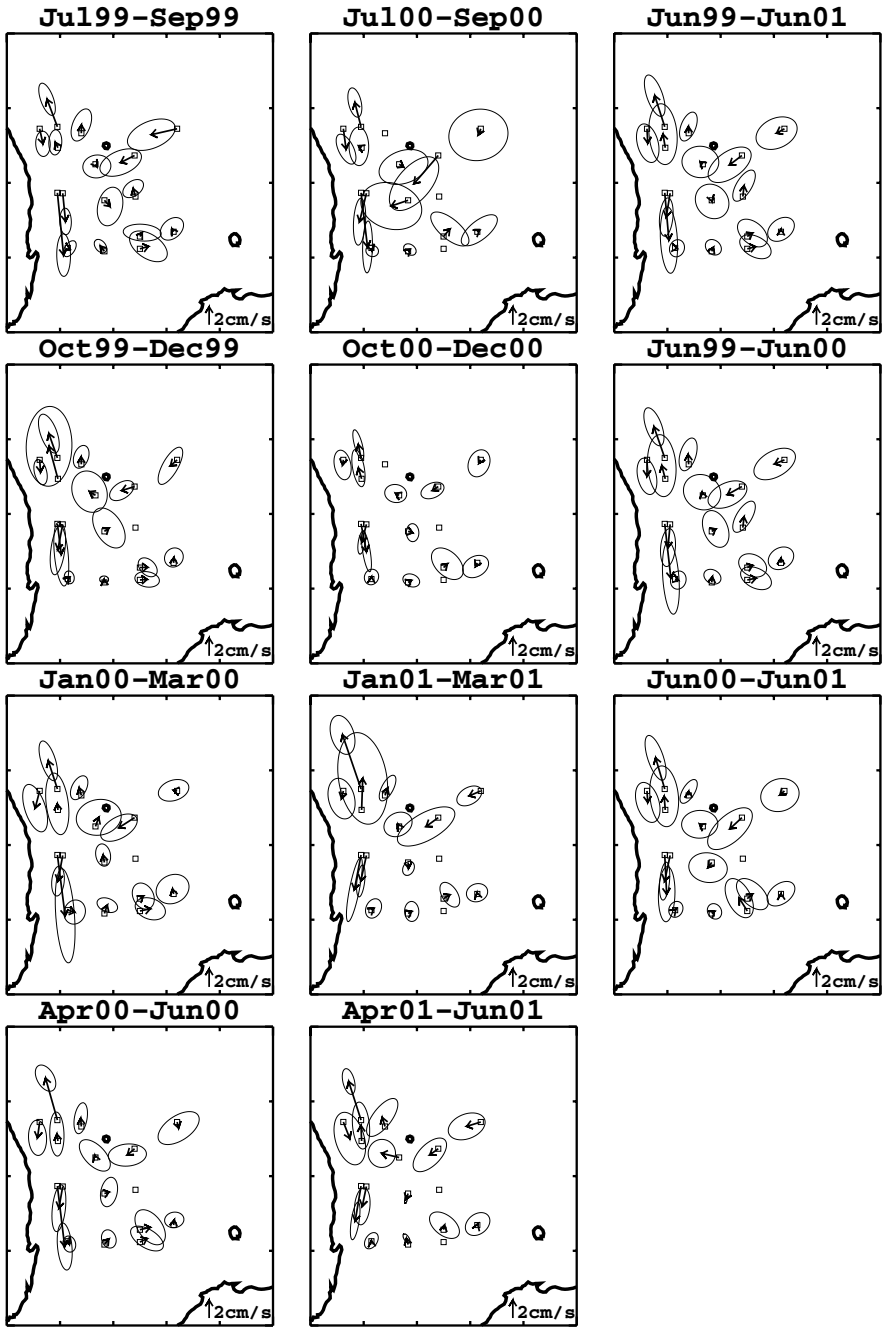

Figure 39: Mean current vectors and variance-ellipses

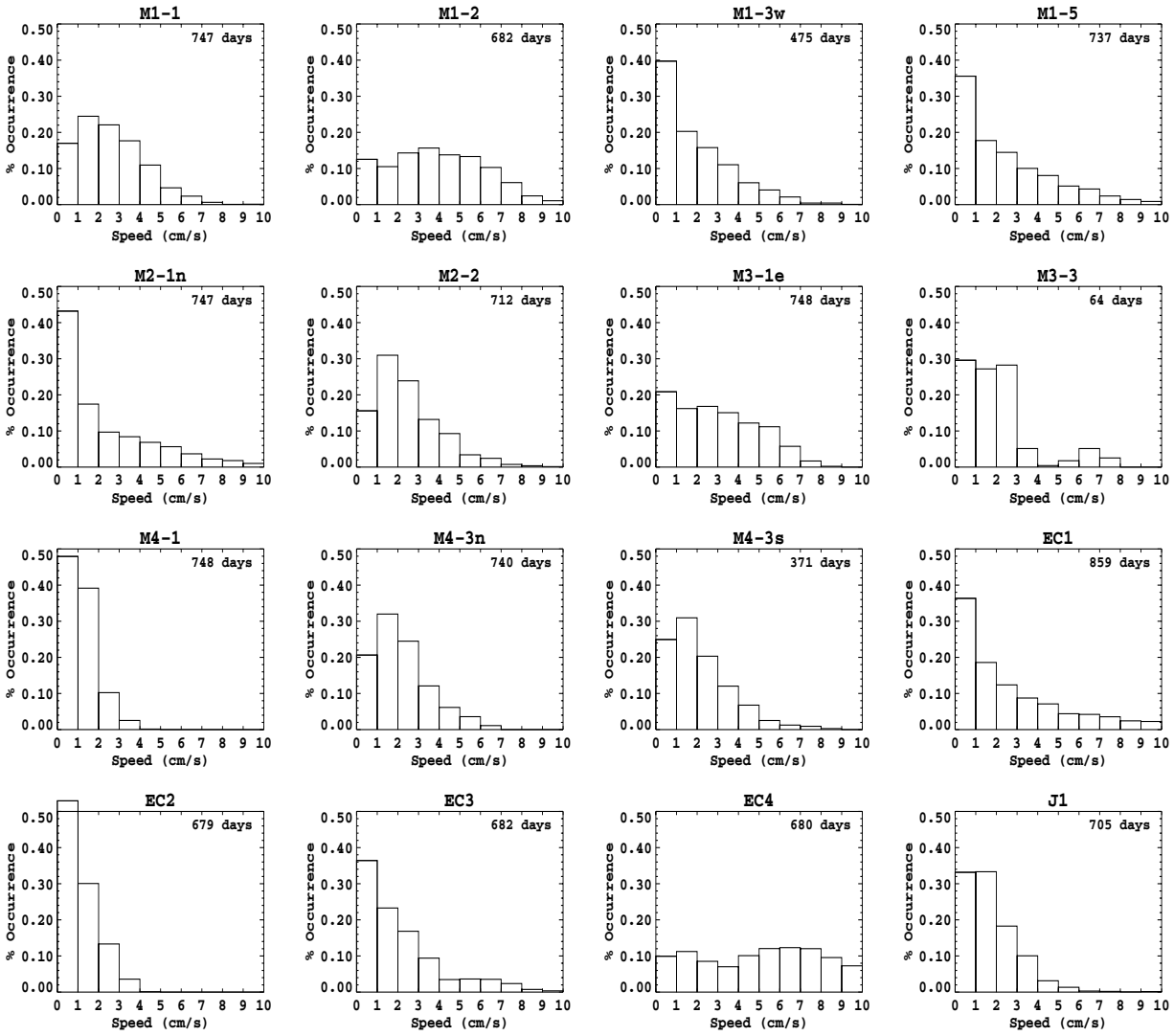

Figure 40: Histogram of speed.

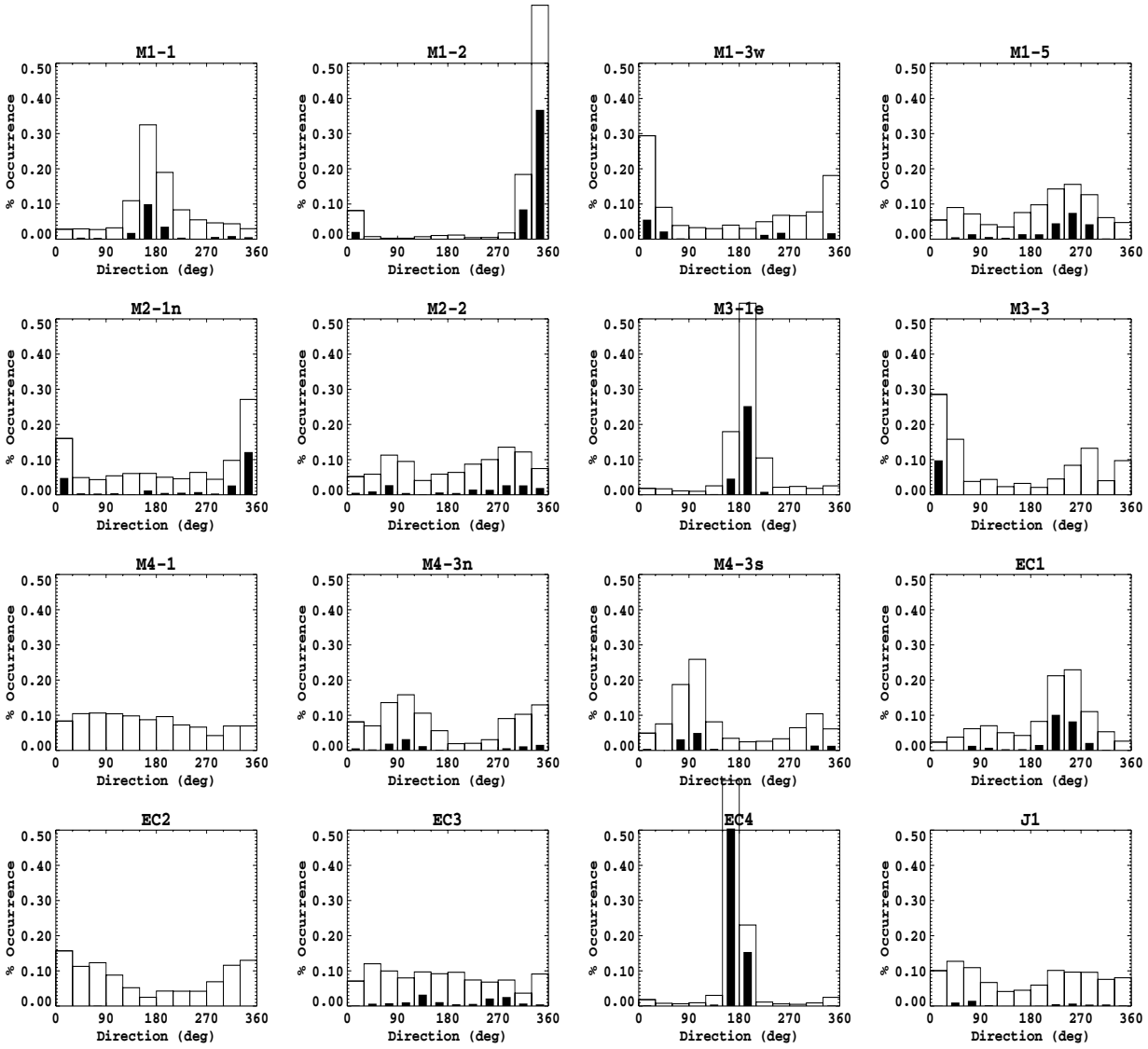

Figure 41: Histogram of direction. Note: open bars are for the full record, thin solid bars are only for speeds of 4 cm s^{-1} or more

10 References

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